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with all my love
always forever.
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A
CONDENSATION OF MATTER
UPON THE
ANATOMY, SURGICAL OPERATIONS AND
TREATMENT OF
Diseases of the Eye,
TOGETHER WITH REMARKS.

EMBELLISHED WITH

TWELVE LITHOGRAPHIC PLATES,

ILLUSTRATIVE OF THE

ANATOMY, OPERATIONS, AND MORBID APPEARANCE.

By John Mason Gibson,
Member of the Medical and Chirurgical Faculty of Maryland.

Scire tuum nihil est, nisi te scire hoc alter sciat.——*Pers. Sat.* 1st.

BALTIMORE:
PUBLISHED BY W. R. LUCAS,
1832.

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1832

TO

PEREGRINE WARFIELD, M. D.

OF THE DISTRICT OF COLUMBIA,

This work is most respectfully inscribed, as an emblem of esteem for his intrinsic worth and high professional ability,

By his unfeigned friend,

JOHN MASON GIBSON.

Baltimore.

DISTRICT OF MARYLAND, TO WIT:

Be it Remembered, that on the thirteenth day of August, Anno Domini, 1832, John Mason Gibson, of the said district, hath deposited in this office the title of a book, the title of which is in the words following, to wit:

A condensation of Mattter upon the Anatomy, Surgical Operations, and Treatment of *Diseases of the Eye*, together with remarks. Embellished with twelve Lithographic Plates, illustrative of the Anatomy, Operations and Morbid appearances. *By John Mason Gibson,* Member of the Medical and Chirurgical Faculty of Maryland.

Scire tuum nihil est, nisi te Scire hoc alter sciat.—Pres. Sat. 1st.

The right whereof he claims as Author in conformity with an act of Congress, entitled, "An act to amend the several acts respecting copyright's.

PHILIP MOORE, Clerk of the District.

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PREFACE.

In promulgating a work of this kind, an author labours under no little anxiety to foresee whether or not it will be viewed as a successful attempt at collecting the best matter upon diseases of the eye, it having been gotten up mostly with the intention of brightening the path of the more youthful practitioner, by leading him on to that grand point, the true treatment of disease. In this work he has the anatomy of the most important parts minutely described by very able anatomists, together with the pathology of Ophthalmia, thoroughly investigated by that excellent oculist, Thos. Mackenzie of Scotland, with operations by authors equally as powerful; and that it may serve as a proficient helmsman to his barque when tossed upon the ocean of hypothesis, is devoutly to be wished for.

It must be acknowledged that diseases casual to the organ of vision, are many, and frequently to be meet with in this country; however, I believe the curative practice has not been sufficiently inculcated in our Universities, by impressing upon the mind of the student, where and when the importance and great nicety of judgment are requisite in the treatment of them, and that by inadvertent and mal-practice the victim may grope through his existence here in a valley of darkness.

The work is one of compilation. It could have been more enlarged; but as the author has given insertion to what in his own judgment he deemed the best practice, he conceived it superfluous to add more. The author's claims to originality do not extend father than too the construction of the plates. If the work proves to the young and unexperienced votary of Esculapius a correct guidance in combatting and effectually arresting disease, and assists him in bringing about a more simple and comprehensive diagnosis by which each particular malady meets with its antidote, it will be the *ne plus ultra* of the author's wishes.

ANATOMY OF THE EYE.

The organ of vision is divided into hard and soft parts; the former makes up the funnel-like cavity, which envelopes about two-thirds of the eye-ball. Seven bones enter into the formation of each orbit, viz: the Os Frontis, Os Sphenoidal, Os Ethmoides, Os Maxillare, Os Malæ, Os Unguis, and Os Palati. The orbits have their edges, sides and bottom. The edges are formed by the Os Frontis, Os Maxillare and Os Malæ; the bottom by the Os Sphenoides and Os Palati; and all these bones, except the Os Palati, contribute to form the sides. The bottom is perforated by the foramen opticum of the Os Sphenoides. And the external sides, near this foramen, two orbitar fissures, one superior, called Sphenoidalis, the other inferior, denominated Spheno Maxillaris, viewing the orbit, many depressions and elevations are seen. Near the external angle, and upon the roof of the orbit, is one very conspicuous. This depression gives situation to the lachrymal gland. The different orbitar plates are perforated in several places for the egress and ingress of blood-vessels, nerves, and lymphatics; and through the superior fissure, the Ophthalmic Vein, nerves and sanguinous vessels, the Optic Foramen, Optic Nerve and Ophthalmic Artery. The orbits have their surfaces, internal and external angles.

These cavities are lined by a membrane, supposed by some anatomists to be a continuation of the dura mater through the fissures in the bottom of the orbits; but from the semblance which it bears to the periosteum of other parts, it is nothing more than a continuation of the proper periosteum of the face and craneum into the orbits, where it is named Preorbitæ, and has its proper vessels and nerves. Before entering the orbits, it becomes considerably thicker at their edges, which, projecting forwards, assists in covering the eye-ball, giving attachment, likewise, to the common integuments of the Palpebræ.

On the superior edge and in the internal angle of each orbit, is a notch formed in the bone, denominated the superciliary notch; a little foramen is sometimes placed in the centre of it for the passage of a nerve, artery and vein: attached to this notch is a loop or pully of a ligimentous structure. Through this loop plays the tendon of the obliquus superior muscle. The orbits of some persons are largely filled with adeps, or fatty substance, which serves as a cushion to the eye-ball, and gives that beautiful projection and fulness to the eye. In superanuated individuals, this fatty substance is very small in quantity, consequently, the eye-ball recedes to the back of the orbit. This fluid is contained in cells of the cellular tissue.

The soft parts are the proper tissues, humours, blood-vessels, nerves and lymphatics. The existence of lymphatics in the eye-ball, is, by some anatomists disbelieved, as no anatomical investigation has heretofore exposed them to autopsy; but, reasoning from analogy, the eye-ball, being composed of tissues similar to the other membranes of the body, I doubt not the existence of them in this organ.

We find in the composition of the eye-ball, four distinct tissues or membranes, viz: the mucous, cartilagenous, fibro-cartilagenous and serous. For the first, we have the conjunctiva;

second, the cornea; third, the sclerotic coat, and for the fourth, that membrane which envelopes the aqueous humor. The choroid and iris are considered belonging to and being of the same nature of the serous tissue.

MUSCLES.

Six muscles belong to the eye-ball: they are the rectus superior and inferior, internus and externus, obliquus superior and inferior: all these muscles arise within the orbit. The four straight or recti muscles originate tendinous, (like all other muscles,) from about the optic foramen, and are inserted into the sclerotic coat by broad tendons; these tendons before their insertion unite to each other, which gives additional strength and thickening to the anterior part of the sclerotic coat; they are inserted into this coat within a few lines of the edge of the cornea. This origin and insertion are truly interesting and beautiful. A better knowledge of these muscles can be obtained from twenty-four hours dissection than two years reading.

PALPEBRÆ OR EYE-LIDS.

The eye-lids are made up of muscles, cellular membrane, common integuments and cartilage. There are two muscles belonging to the lids: the first, denominated levator palpebrarum, second, orbicularis palpebrarum. The latter gives the shape to the superior and inferior lid, the former elevates the upper lid. This muscle is said by some to be inserted only into the superior tarsal cartilage in its whole length. In coming out of the orbit, it soon spreads out into a broad fan-like tendon, running between the conjunctiva and orbicularis palpebrarum and is inserted, as is stated by very minute anatomists, into the above named cartilage. It is, moreover asserted, that if we remove the tarsal cartilage for entropium, the lid would remain nearly motionless, the point of insertion then being removed, the muscle could consequently have no controul over the upper lid, but we find this not to be the fact. This tendon is enveloped in its proper fascia, (similar to all other muscles,) and has connections with the orbicularis muscle and conjunctiva by cellular membrane through the whole of the lid;—it is a voluntary muscle. This cellular membrane being so destitute of adepts in health, that the frequent odema of certain portions or whole of the palpebræ in Opthalmia Tarsi, or conjunctivites, is owing to serous infiltration in these cells.

"When the eye-lids are forcibly closed by the contraction of the sphincter fibres of the orbicularis palpebrarum, the tendon of this muscle starts forward, and the rugæ are extensively radiated from the nasal angle over the skin of the cheek; on removing the skin and the subjacent cellular tissue of the palpebræ, the thin-spread fibres of the orbicularis muscle are seen. The tendon with which these fibres are connected, is a little round cord, distinctly seen and felt beneath the teguments, implanted in the nasal process of the maxillary bone, in the great transverse diameter of the orbit. The fibres which lie upon the palpebræ are the interior fibres of the muscles, the fissure of the lids being the axis of the oval formed by it. The inferior external fibres, from the round tendon and contiguous parts of the maxillaris bone, take an extensive sweep over the orbitar ridge upon the cheek, towards the temple, where they become thin and scattered. The superior, from the round tendon and contiguous parts of the frontal bone, takes the direction of the superciliary arch; being at their commencement connected with the fibres of the corrugator, and in their course blended with those of the frontal muscle."

We find situated at the edges of the lids, two cartilages, that on the upper, termed superior, and on the lower, inferior tarsal cartilage, the angles formed by the meeting of these cartilages, are called the external and internal canthus. These cartilages are firmly attached to the margin of the obicularis muscle, by the intervention of cellular substance. The upper tarsi is broader than the lower, which can be ascertained by everting the lids. Growing from the outer or external edge of the tarsal cartilages, are small hairs of unequal lengths in different individuals, termed cilia or eye-lashes. These cilia add considerably in giving expression to the eye and moderating the strong rays of light. At the root of each hair is situated a small gland. These bodies which are only seen distinctly by a magnifying glass, have been called ciliary glands; they are imbedded in the substance that joins the tarsal cartilages to the obicularis muscle.

When the lids are closed, the tarsal cartilages touch each other only at their external or ciliary edge, an angular groove or sulcus being therefore formed, gives passage to different secretions of the eye in the lachrymal apparatus.

In the internal canthus and near the caruncula lachrymalis, are two small foramina, one in the upper and another in the lower tarsal cartilage, large enough to admit a hog's bristle, but can be dilated to a greater extent by a proper probe. These foramina, seem encircled by a peculiar cartilage, indeed they are a little elevated from the surface of the tarsus. These small openings are the beginning of two small tubes which communicate with the lachrymal sac; they perforate the sac on its anterior surface, very near to each other, running in an oblique direction downwards and inwards through the substance of the lids. These conduits convey the tears into the sac upon the principles of absorption. They are called puncta lachrymalia.

The lachrymal sac is rather of an oval figure, composed of two coats united together by cellular tissue; the external fibrous, the internal mucous, placed in the concave surface of the Os Unguis, and protected somewhat from external injuries by the process of the superior maxillary bone, it is covered partly by a tendinous expansion of the obicularis muscle. The sac is about the size of a common sized bean; that part which continues downwards is called the nasal duct, which duct runs through the bony parieties downwards, outwards, and slanting a little backwards, opens under the lower surface of the inferior spongy bone. The sac and duct resemble Farenheit's thermometer. The sac, the bulb, and the ductus ad nasum, the tube; the duct and sac are covered externally by cellular membrane.

If a probe is made to pass in a line drawn vertically from the nasal side of the superciliary notch, it passes directly through the nasal duct into the nose. On everting the lids, we discover a row of whitish bodies of about the eighth of an inch in length, more numerous in the upper than the lower lid. It is said, these bodies are glands and secrete an unctious fluid. There excretory ducts appear to open on the internal margin of the tarsal cartilages. They are denominated the Meibomian follicles.

The supercilium, or eye-brow is a tuft of hair situated over the superior margin of each orbit, differently shaped in individuals; in some arched, in others nearly angular. These tufts of hair serve important purposes, in moderating the rays of light striking the eye, and preventing the perspiration from running into the eye which would be likely to cause frequent conjunctivitis. The different arrangement of the supercilium, arched or angular, changes very much the general aspect of the countenance.

LACHRYMAL GLAND.

The lachrymal gland is situated in a depression in the superior orbitar plate, near the external angle, and about a quarter of an inch from the superior orbitar edge, considered a conglomerate gland, has a convex and concave surface. The former suits to the depression in the bone, the latter, the convexity of the eye-ball, divided into three lobes, the anterior, middle and posterior; these lobes are united together by cellular tissue. This gland has rather an oblique position, fastened firmly to the periosteum of the obitar plate by something like a muscular fascia and ligaments; it is about twelve lines in length and seven in width, resembling the parotid gland, and having proper vessels and nerves which enter its substance on its posterior surface. Seven or eight excretory ducts originate from its anterior surface, which running in parallel lines downwards between the conjunctiva and tendon of the levator palpebrarum, perforate the conjunctiva near the edge of the superior tarsal cartilage.

OPHTHALMIC ARTERY.

The eye is principally supplied with blood by this artery originating from the internal carotid, which, before it enters the orbit, has a short curve, it passes into the orbit through the foramen opticum somewhat below the temporal side of the nerve, the arteria centralis retina which occupies the centre of the optic nerve, the long ciliary arteries are the branches which it first gives off. The lachrymal artery sends off a ciliary branch, another to the rectus externus, and one which runs on the inferior surface of the eye-ball, distributes twigs to the obliquus inferior muscle, and gives off two or three branches to the lower lid. The main lachrymal branch, dividing into two large branches, one inosculates with the deep seated temporal branch of the internal maxillary artery, the lachrymal gland and upper lid are supplied with blood by the other branch. The trunk of the ophthalmic artery finally passes obliquely under the optic nerve, and arriving at the nasal side of the nerve, sends off many small branches to the different parts of the eye, one branch called the frontal, runs through the supra orbitar foramen, a nasal branch which passes into the nose through the anterior œthmoid foramen, the ophthalmic artery arriving at the internal canthus, supplies the palpebræ and superciliary branches, afterward anastomoses with the nasal branch of the facial artery from the external carotid.

"The muscular branches penetrate between the fibres, and running in the same direction, appear beneath the conjunctiva on the sclerotic coat. Here they subdivide and ramify upon the conjunctiva; the fasciculi inosculating so as to form a faint circulus arteriosus around the cornea, when filled with coloured blood. This distribution of these vessels are generally seen in iritis. Those of the rectus internus are most numerous." The veins follow the arteries.—With respect to the nerves: The eye receives from the brain, besides the optic nerve, the following third pair, or mortores, fourth or pathetici, first division of the fifth, or trigemini, and the sixth, or abducentes.

CONJUNCTIVA.

This membrane is considered as belonging to the mucous tissue; it covers the anterior surface of the eye-ball, having connection with the sclerotic coat through the intervention of cellular membrane; it is here termed "*membrana oculi conjunctiva*," that portion which lines the internal surface of the lids, "*membrana palpebrarum conjunctiva*." The conjunctiva is an extremely delicate membrane possessed of a large number of nerves and serous vessels; these vessels in conjunctivitis are charged with red globules or the sanguinous portion of the blood-This tunic seems to have originated from the external margin of the tarsal cartilages, and passing backwards to line the lids, is finally reflected over the front of the eye-ball. This point of reflection is called the commissure of the conjunctiva; a duplicature, or a folding of this tissue, is seen in the internal canthus, termed the similunar fold; it is shaped very like the swallows tail, and situated just in front of the caruncula lachrymalis. The conjunctiva arriving at the edge of the cornea, sends off an excessively fine and transparent membrane which covers all the anterior portion of the cornea, the conjunctiva likewise gives the internal coat to the lachrymal aparatus. The caruncula lachrymalis is situated in the internal canthus, a gland, of about the size of a small pea, of an oval shape; on its superior surface are three or four small hairs, which can be seen by a magnifying glass, it lies upon a portion of the semilunar fold. The use of this glandular-like body is not satisfactorily understood: some anatomists say it serves to keep the superior and inferior punctum in a proper position, and that, by the aid of this body, they perform their absorbent powers.

I have oftentimes examined this glandular body, but never could discover an excretory duct coming from it, though I am of the belief that the caruncula lachrymalis, as it is termed, performs an office similar to other glands, that of secreting a peculiar fluid for the necessary uses of the conjunctiva and adjacent parts, and has its proper excretory ducts.

SCLEROTIC COAT.

This is a strong, white, elastic, fibro-cartilagenous tissue, which forms the globular shape of the eye-ball. It is supposed to be thicker in some parts than others, which increase of thickness I have never seen, as it presents one common size all through, that is, when detached from the adjacent cellular membrane and tendons of the recti muscles.

The sclerotica is the uttermost of all the coats: in health it is nearly destitute of a vessel carrying the red blood; in the infant, this can be better seen, as it has a beautiful bluish white aspect. The sclerotic coat has its proper vessels and nerves; the vessels belong to the serous and convey nothing but the white blood. Two large foramina are seen, one anteriorly, which is the larger, and the other posteriorly for the passage of the optic nerve, which is the smaller. Through the anterior foramina, the rays of light pass to impinge upon the retina; however, this foramina is closed by the cornea, this latter coat being firmly attached to the former by a wedge like union: the sclerotica is perforated near the optic nerve in many places for the exit and entrance of nerves, sanguinous vessels and lymphatics: covering this coat externally, is the cellular tissue. Mr. Stratford remarks, that the sclerotic "is of the nature of those membranes anatomists have designated by the name of fibrous, similar to the dura mater and periosteum in formation: it is a hard, firm, and whitish membrane, consisting of fibres firmly attached and interwoven, not separable by maceration, in the adult state, but said to be divisable into two layers in the fœtal eye; at this period it certainly is not strong, so that perhaps its fibres permit of forcible division. The sclerotic coat forms little less than four fifths of the posterior covering of the globe; it is thickest at the posterior part, but considerably thinner anteriorly, where it is covered by the expanded tendons of the recti muscles, which have often been enumerated as a coat, under the name of tunica albugenia; it has little vascularity in the healthy state, its vessels circulating but a serous fluid; when, however, in a state of inflammation, they become enlarged, and carry red blood, so as to give this structure a pink colour. On its posterior surface the sclerotic coat is sometimes pierced by a round opening, which gives passage to the optic nerve; but generally in its place we find a multitude of minute foramina, which serve to admit the separate fibres of this nerve; one or two, however, are remarkable among them for their size: these permit the artery to enter, and the central vein of the retina to escape into the orbit: it is called the cribriform plate, from these numerous perforations. Besides this, we may also observe many minute oblique foramina, through which the ciliary vessels and nerves pass. Anteriorly we find a circular opening, six lines in breadth; this, in the unseparated condition, is filled up by the cornea implanted in a groove of the sclerotic coat, the outer margin of which, passing forwards upon the circumference of the cornea, is connected to it with very great strength and firmness; to use a familiar simile, *it* bears some analogy to the manner the glass is fixed in the watch-case.

The membrane which encloses the optic nerve, and forms its sheath, is described by some as the commencement of the sclerotic coat; this has also been said to be continued from the dura mater; it certainly bears a very great and striking resemblance to it, both in the quality of its tissue and the nature of the office it performs.

The external surface of the sclerotic coat is covered by a cellular tissue, that connects it to the surrounding parts within the orbit, while we find its internal clothed by the choroid coat, which is in immediate connexion with it."

CORNEA.

The cornea is undoubtedly a transparent cartilagenous tissue; evacuate the aqueous humour, and it presents all the qualities of a cartilage. I never could detect any thing in this coat bearing resemblance to a fibre; it is made up of lamellæ or layers, consisting, as is alleged of five or seven of these lamellæ, they are attached to each other by cellular membrane; these lamellæ are more firmly united at their centre than circumference; the external layer has a covering given off by the conjunctiva, the internal is lined by a serous tissue, which tissue encompasses the aqueous humour. The same author says, "the cornea is that transparent membrane placed upon the anterior surface of the sclerotic coat, and so firmly connected to it that they were formerly considered one and the same, and were described under the names of opaque and lucid cornea; but a more attentive examination demonstrating their texture and conformation, has fully proved the fallacy of this position. The cornea is formed of strong transparent, and fibrous lamina, which are superadded upon each other; these are generally six in number, and are connected by a cellular tissue, which forms many little cells between each layer; these cells contain a transparent fluid, secreted by very minute and colourless exhalent vessels: such is the admirable contrivance that renders this firm and dense structure permeable to the rays of light. Without this peculiar apparatus every fibre that crossed the pupil would of necessity reflect a portion of the light, and thus intercept and confuse the view of every object presented to the eye. We find that many minute and strong substances, which reflect the rays of light when in air, and are hereby obvious to the sight, when wetted or immersed in water, become invisible; so I imagine the aqueous secretion penetrates each layer of the cornea, distending and separating each fibre of its substance; and these fibres being immersed in or lubricated by this pellucid fluid, freely permits the passage of the rays of light, which, without this beautiful provision, would be reflected off from the cornea. Thus, after death, when evaporation of this fluid has taken place, and we can, by pressure, bring the fibrous layers nearer to each other, a white appearance presents itself; that is, the light is reflected from the two closely approximated layers of the cornea. I apprehend the same thing would take place in the living eye, were it possible to remove the fluid. The human cornea is a pretty regular sphere, convex anteriorly, concave within, serving, with the sclerotic coat, to support the more fluid parts; without, we find it covered with a layer of conjunctiva, which is firmly connected to it by cellular tissue, and so intimately participates in the same contrivance to secure its transparency, that is with difficulty we can demonstrate their separate existence. Upon its outer surface this also secretes a fluid, that assists to render it pellucid. Upon its internal surface is a layer, which has been called the membrane of the aqueous humour; that this layer exists, is perfectly demonstrable; but that the membrane is reflected over the iris and capsule of the lens, is a fact that analogy only can confirm. The aqueous humour being a serous fluid, that is called its capsule, and is likened to the other serous membranes of the body. Disease sometimes leads us to imagine that it is present, for in inflammation of the iris, I have distinctly perceived this lamina of the cornea simultaneously affected; and may not this partly account for the muddy appearance the anterior chamber generally exhibits in this affection?

The vessels that nourish the cornea proceed from the anterior ciliary arteries; these are the extreme branches that supply the muscles of the ball, which going forwards, pierce the sclerotic coat to form inosculations with the vessels within the eye. In this passage through the sclerotic coat they give off many minute branches, which in health carry but a serous fluid, and thus transparent are perfectly invisible; it is but in disease, when their calibre is increased, and they suffer the red globules, or rather a larger quantity and denser quality of coagulable lymph; to pass along them, that they become in any way demonstrable; thus in inflammation of this tunic we find a beautiful circle of little pink-coloured vessels forming an areola around the cornea, and penetrating into its very substance, while its whole surface takes on a muddy appearance, which I apprehend is now accounted for by the supposition that a denser fluid now permeates these serous branches.

In infancy the cornea is thicker in its substance, and more lax in its texture, than in adult age. It now also contains a greater secretion of interstitial fluid, which necessarily increases in some degree the convexity of its surface, which is, perhaps, a provision for the greater refraction of the rays of light in the infant eye, a circumstance which in the adult is sufficiently provided for by the general increase of size."

IRIS.

The iris may be compared to a curtain suspended in the aqueous humonr, dividing the space occupied by that humour into the anterior and posterior chambers; the anterior is considered the most spacious and contains the largest part of the aqueous humour. The iris is composed of two membranes, the anterior is made up of muscular fibres; these fibres are of two kinds, the straight and circular; the latter has been demonstrated by Dr. Monro, which he says encircles the pupillary part of the iris and occupies about one-fifth of it. The posterior layer is denominated the uvea; it has upon its inner surface the black pigment which gives that black aspect to the pupil. This membrane is firmly connected to the anterior or muscular layer by cellular tissue. The iris appears to be a continuation of the choroid; it is largely supplied with blood-vessels and nerves, though these vessels, in health, convey pretty much the serum. The circular opening in the centre of the iris is called the pupil; this pupil is closed by a membrane in the fœtus, termed membrana pupillaris. It was first noticed by Wachendorf, in 1738; but its discovery is also claimed by Haller, Albinus, and Dr. Wm. Hunter, who observed it about the same period. "In the dissection of the fœtal eye, we may discover the little red vessels of the delicate membrane shooting across the pupil, and inosculating with those that proceed from the opposite side: they are generally visible after a minute injection until about the seventh month, when the consistency and vascularity of this diaphenous web appears gradually to decrease, until the hour of birth, when, upon the admission of the first rays of light that impinge upon the retina, the iris is excited into action, and finally ruptures its delicate fibres. That it is a membrane is proved beyond all doubt, for unless supported by cellular tissue, the vessels which are sufficiently obvious could not exist, for indeed they must possess vasa vasorum to nourish their coats, and connect them with the general system. I have before mentioned the membrane of the aqueous humour, which is said to be reflected over the anterior chamber of the eye: if this really exists in the fœtus, it must be double, that is, clothing both chambers of the aqueous humour, which this membrane must now serve to divide. Indeed, I think it probable that the minute vessels may pass between their layers, and may with them form the membrane in question."

"I find that the membrana pupillaris is described by M. Jules Cloquet as a reflection of the membrane of the aqueous humour. He says, "La membrane pupillaris est evidenment formée de deux feuillets diaphanes et adossés l'un à l'autre. Le posterieur appartient à la chambre correspondante dé l'œil, et naît du pou pourtour de la pupille; l'antérieur dépend de la membrana de l'humeur aqueuse qui tapisse la face posterieure de la cornée transparente et toute la chamber antérieure de l'œil."

"Having considered the motions of the iris, we know that in the absence of its proper stimulus—light, the pupil is fully dilated, and so it would be in the unborn infant, unless this membrane held it in a medium state of dilatation, until its organization be completed, and it has arrived at such perfection, that upon the first call of the iris to its office, its last remaining fibres, now so few and delicate, are ruptured by the first motions of the membrane."

The iris has two circles or edges; the one surrounding or forming the pupil, termed the pupillary edge or lesser circle, that in conjunction with the ciliary ligament, the ciliary circle or edge. The iris appears by nature destined as a guard or sentinal for the retina, for when strong rays of light are thrown upon the eye, or when a person enters a light room from a dark one, we can perceive the iris contracting powerfully, vice versa, a dilatation is manifest: the pupil of the cat species is vertically oblong, that of the human always circular, when undiseased; the larger circle of the iris is united firmly to the lower margin of the ciliary ligament.

The following is from the pen of the able anatomist, Dr. Christian Salamon of the Medical and Chirurgical Academy of St. Petersburg: he says, "Having subjected the iris to maceration, as I knew that by such a process the choroid coat might easily be divided into two layers, I succeeded in doing the same with this membrane. To such a division of the iris into two layers, I was led by the observation of some writers on the anatomy of the eye-ball, that the membrane of the aqueous humour is continued over the iris into the posterior chamber; but with them it has been a mere supposition, and not proved by dissection. If there is such a continuation over the iris, this membrane must be divided into two layers; in ascertaining this I succeeded, and shall now endeavor to give a description of my dissection. I performed the division more easily from the pupillary margin of the iris, where this membrane is thicker," (I have examined this portion with the rest of the iris but could not discover any peculiar thickness more than what was in the whole of the iris,) "and at this place I could evidently distinguish the turn which is formed by the anterior layer of the iris continued into the uvea; betwixt these two membranes I saw distinctly the nerves and vessels distributed in a tortuous manner. Both membranes appeared somewhat transparent. The anterior layer, constituting the fore part of the iris, secretes on its inside and between the two layers a pigmentum, which exhibited itself to me in dark eyes, darker than in light ones. From the remarkable difference of this pigmentum in its color, I am inclined to think that the different color of the iris particularly depends upon it, which then only can appear evident when the uvea secretes its pigmentum. The anterior layer is afterwards continued to the tendinous ring, when it unites with a serous membrane, which I consider the origin of the venous layer of the choroid coat under an acute angle. The posterior layer or uvea secretes on its back part the pigmentum nigrum; when this pigmentum is removed, there appears small white processes going off from the ciliary processes to the uvea, being continued from the ciliary towards the pupillar margin, but not quite reaching the latter; these processes are, like the ciliary processes, more distinctly seen in dark eyes, and differ from them only in their smallness."

Mr. Stratford says, "The iris, so named from the variety of its colour, forms one of the most striking traits in the human countenance: it gives a brilliancy to the eye, a sprightliness and animation to the features, which are peculiarly interesting. It is that coloured membrane which is hung in the anterior chamber of the eye, and acts as a curtain to regulate the quantity of light to be admitted to the retina; it is of a circular form, having a greater and lesser margin; the greater is firmly connected to the ciliary ligament, while the lesser forms the pupil, which is the circular hole in the centre of the membrane: this we find is nearer on the nasal than on the temporal side, to the ciliary ligament. The iris floats freely in the aqueous humour, dividing it into anterior and posterior chambers. The anterior chamber of the aqueous humour is the largest, being about a line and a half in depth, while the posterior is but the fourth of one, at most. By some anatomists the iris has been considered a continuation of the choroid coat; but the disposition of its vessels, combined with its difference of function, obliges us to consider it a separate and distinct membrane."

"The iris is said to be composed of muscular fibres, a vascular net-work of vessels, and an apparatus which secretes the pigment, called uvea. Over these, and reflected upon its surfaces, is described the membrane of the aqueous humour; this, after a very attentive examination, I have not been able to discover; but reasoning from analogy, I am led to believe it exists."

"With respect to the muscular fibres, authors have long been at variance concerning their existence. That the iris, however, possesses them, seems very probable; but we have not been able to prove it satisfactorily to demonstration. From the nature of its actions, however, I am led to conclude that they exist, and that this texture of the iris is not formed as the German anatomists would have us believe, by little cavernous bodies, which it was supposed are filled with blood in the contracted state of the pupil, and, like the cavernous body of the urethra, were comparatively empty in the relaxed, when the pupil was dilated. Pretty as this theory of the conformation of the iris may sound, we cannot bring it to the proof by demonstration, and so must depend upon analogy in our decision of the muscularity or non-muscularity of this membrane. I would conclude that it was muscular, from the quickness of its movements, and its exact correspondence with the other sphincter muscles; thus in fainting and compression of the brain, we find it dilated. Another proof which I think will tend greatly to convince us of the fact, and is decidedly at variance with the German hypothesis, is, that in inflammation, this membrane becomes permanently dilated, and the pupil, of course contracted, as the generality of other muscles do, from the interstical deposition of coagulated lymph; while in the cavernous body of the penis, we find effusion of lymph seal up the mouths of its cells, and prevent the passage of blood into them, whence the penis is afterwards always in a relaxed state, and not to be excited by libidinous ideas. Indeed, M. Maunoir affirms, that he has seen the muscular fibres by the aid of a glass, and that they are arranged in two directions, radiated and circular. The radiated he describes as proceeding from the ciliary margin towards the pupil, and by their contraction, to dilate it; while the circular are internal, surrounding the pupil, and form a sphincter muscle, which contracts the diameter, or entirely closes it. This is a fact, which, I confess I have not been able to discover, but must at the same time, consider its existence as very probable."

"In the iris we also find a provision similar to that in the choroid coat, for the secretion of a pigment which is here called the uvea, as in that texture we find an intricate plexus of blood vessels, affording pabulum to the minute villi that pour out this paint."

"The villi which secrete the uvea, as it is called from its resemblance to the colour of the grape, I apprehend to be a glandular structure, profusely supplied with very minute arterial branches; in an injected state it isparticularly red. The uvea, which is placed upon the possterior surface of the iris, shines through this semi-transparent membrane, and gives that variety of colour that is observable in the eyes of different creatures. Its tints would appear to vary with the colour of the hair, or complexion of the individual. In very dark people we find it of a brown colour: in the eyes of individuals that possess a fair skin it assumes a light blue; while in others, such as the albinus, it is entirely absent, when we find the iris of a red colour. This pigment I have described as similar to the choroid secretion, save it seems more firmly to adhere to the posterior surface of the iris: this is accounted for, however, I apprehend, by the following circumstance, viz: that it has a layer of the membrane of the aqueous humour reflected over it: this would, indeed, appear more than probable, for unless something covered it from the action of the aqueous humour, it would be washed off by the motions of the iris, and float in the anterior chamber. The use of this pigment is to secure the thorough opacity of the iris, so as to prevent the light from passing through any part of this membrane, for unless it possessed it, it would not be so effectual a guard to the retina."

"The arteries which supply the iris with blood are the branches of the opthalmic, called long ciliary arteries; these passing forward between the selerotic and choroid coats, pierce the ciliary ligament, when they divide into two twigs, which pass almost at right angles, and having arrived at the outer margin of the iris, inosculate with the minute twigs of the short ciliary arteries, and form a very obvious vascular circle at the great circumference of this membrane. From this point a multitude of minute vessels proceed: when the pupil is contracted they run in straight lines, but when it is dilated they are convoluted, passing in the radious of a circle, until they arrive about midway between the ciliary and pupillary extremities: here they form a second anastomosis, and again give out a number of very minute twigs, which run in a like manner to the margin of the pupil. The returning veins intermingle with the arterial branches, and pass either into the vena vorticosa, or into the trunks that accompany the long ciliary arteries."

"The iris is very beautifully supplied with nerves, which proceed from the lenticular ganglion supposed to be its centre of nervous sensibility. I have shown how this ganglion is formed, by a branch of the third pair, or motôr nerve, a twig from the fifth, or nerve of sensibility, united to the fibres coming from the superior cervical ganglion of the sympathetic. From this point the ciliary nerves pass forward to the eye, pierce the selerrtic coat, running between it and the choroid, until they arrive at the ciliary ligament: here they are divided into many minute fibres, which go to regulate the motions of the iris. According to the nerves which it receives, we should expect this membrane to be under three influences. In the first place, it is governed by the sensibility of the retina, which excites the motôr nerve that is minutely distributed to the muscular apparatus; secondly, this being a nerve of voluntary motion, must bring it under the command of the will; and thirdly, it has a twig from the nerve of feeling, or fifth pair; this, I imagine, as in other parts of the body, receives an impressive, which differs, however, in so much that the iris not being an external part of the body, is not under precisely the same kind of influence, that of common sensation: but we know that the sensibility communicated by the same nerve often differs in degree, so that, in this instance, I suppose the nerve of sensibility to be minutely distributed on the anterior surface of the iris, there to be influenced by the rays of light, whilst although not felt on the external surface of the body, may to this delicate membrane be perfectly perceptible. The connexion of the motions of the iris with the sensibility of the retina, is one of the most prominent and useful qualities, for when rays of light, that act with great intensity, strike upon this membrane, they would injure the nerve, by the violence of their impression, unless the iris contracted, and as a curtain, interposed to diminish the quantity, or altogether to exclude their passage into the eye. But when, from the paucity or little strength of these rays, it is necessary a larger volume should be admitted, we find the pupil dilated, to permit an increased number to infringe upon the retina, and so to render visible, objects that reflect but few or very distant rays. That the motions of the iris are under the command of the will, we should be led to expect, from the nerves that supply them. In Mr. Travers' work is the case of Dr. M. P. Roget, detailed by himself, directly proving the fact, and very ingeniously accounted for by that acute philosopher. I believe that all men profess a power over this membrane, but very few put it in exercise. That the iris possesses a sensibility peculiar to itself, is proved by the circumstance, that in amaurosis, where its motor nerve could receive no excitement from the retina, we often find this membrane acting as freely as when under its immediate controul. It is possible in some cases the will may direct its movements; but if we examine the case with attention, we shall be able to perceive that the contraction and dilatation of the pupil alternates with the admission or exclusion of the rays of light from the iris."

CHOROID.

The choroid coat lines all the internal surface of the sclorotica, and is so firmly attached to it, that the greatest difficulty attends the separation of them. The choroid appears entirely made up of sanguinous vessels and nerves. "The choroidea," remarks Dr. Salamon, "is easily divided into two layers, after maceration of several days. 1. The outer layer, or choroidea, stricte sic dicta, is the thin serous membrane in which the ciliary veins are distributed to form the vasa vorticosa; it appears more distinct at its origin on the inside of the tendinous ring, where it unites with the anterior layer of the iris, and exhibits here, evidently in its transparency, the nature of a serous membrane. I think that this origin of the venous layer of the choroid coat has been described by Duverney as a peculiar serous membrane, covering the choroid coat. This venous layer appears more pallid at its beginning, on account of the ciliary ligament situated under it, and the deficiency of pigment; just behind the ciliary ligament, it is perforated by the ciliary nerves and vessels of the iris. 2. The inner layer, or ruyschiana, is firmer, and secretes its pigmentum nigrum in the back part of the eye-ball on its outside; as soon as it reaches the origin of the zonula ciliaris, it forms the ciliary body, (corpus ciliari,) which begin with a dentated margin, and secretes here its pigmentum nigrum on the inside; hence the impressions of it appears on the zonula ciliaris. Professor Beer distinguishes the posterior part of it as the 'pars non plicata corporis ciliaris,' which is larger on the temporal than on the nasal side of the globe, on account of the retina advancing more forward on the nasal side, as the optic nerve enters more on that side of the globe. This pars non plicata is the very part through which the needle is brought into the vitreous humour in operations through the sclerotic coat, and it is the part which is united by cellular tissue with the zonula ciliaris, to which the processus ciliares have no adhesion in the human eye.' Professor Beer calls the anterior part of this body, pars plica, to the formation of which the ciliary processes contribute. The ruyschiana, after having formed this body, continues forward, having to its inner surface firmly united the ciliary processes, and to its outer, the ciliary ligament—to the back part of the iris into the uvea; so that I consider the ruyschiana as the mere continuation of the uvea. This continuity is not disturbed, after having separated the ciliary processes with their origins; and the appearance of both membranes is completely the same, each exhibiting the nature of a thin serous membrane."

"Having now described the choroid coat and the iris, and the connexion of them anterior to the tendinous ring, I must here remark, that when this tendinous ring is separated from the sclerotic coat, the venous layer of the choroid and the anterior lamina of the iris form one membrane turning towards the cornea for the space of about one line, which appearance makes me believe, that it is the membrane of the aqueous humour, though I could not follow this membrane further by dissection, so as to show clearly its continuation." (This I believe to be a matter of conjecture, for the connection of them to the tendinous ring being so firm, that no process whatever can clearly divide them.) "Yet it is evident that this membrane divides before the tendinous ring into two, the outer and posterior forming the venous layer; the inner and anterior forming the iris, continues, uvea and ruyschiana. That it is a division of this membrane in these two different directions, I conclude from the finer structure of each of these two membranes than of that before the tendinous ring. The expressed character of a serous membrane in the latter, and its similarity in structure with that of the aqueous humour, make me believe, that it is really the membrane of the aqueous itself; pathological observations prove also such a continuity to the iris, i. e. the corneitis so quickly followed by iritis, and *vice versa;* so that the primary inflammation of the cornea is denied by eminent pathologists."

"As to the nature of the iris, choroidea and ruyschiana, I am inclined to think they are of a serous kind, from the appearance which they exhibit in their natural state, and the more so, from the morbid alterations to which they are subject during inflammation, which is most evident in the iris, viz. the disposition to throw out coagulable lymph, even in the slightest degree, of inflammation, and thus to produce an adhesion of the uvea to the capsule of the lens, or to close the pupil entirely; in other cases to form partial or total adhesions of the iris to the cornea. The tubercles in the syphilitic iritis, which Beer calls condylomata, and appear at the ciliar or pupillar margin of the iris, are of a more or less brownish and red color, which variety of color depends on the smaller or greater organization of the coagulable lymph. In a higher degree of iritis, though more rarely, there may be formed an abscess, which occupies, as Beer observes, the middle of the iris; in these respects, as to the liability of adhesive inflammation, and rare occurrence of suppuration in the substance of the iris, it coincides in its nature with that of serous membranes. The same liability to adhesion we may observe in the choroid coat, when a dissection of the eye-ball is performed after a deep-seated inflammation, when we shall find not rarely adhesions of the venous membrane to the sclerotic coat, but more frequently of the ruyschiana to the retina; or after the operation for cataract, adhesions of the zonula ciliaris to the ciliary processes."

(Dr. Salamon speaking of the Zonula Ciliaris, says: "An accurate description of this part has been given by Professor Doellinger (uber das Strahlen-blättchen,) of which I shall mention shortly the anatomical facts. The zonula ciliaris is situated under the corpus ciliare, and the serrated margin of that body denotes its commencement, from which place it goes to the anterior capsuli, and unites with it ultimately. The ruyschiana is easily separated from the retina until it reaches the zonular ciliaris; it is united with this by firm cellular texture. The zonula Zinnii has about three lines of breadth, has an anterior and posterior margin, an outer and inner surface; the outer is connected with the corpus ciliaris; the inner surface is connected with the attenuated continuation of the retina; the anterior part of the zonula is free. The canalis Petiti is formed by the zonula Zinnii and hyaloid membrane; the hyaloid membrane is connected with the posterior capsuli of the lens more backwards, and the zonula Zinnii more forward with the anterior capsuli, so as to leave a triangular space. The zonula consists of fascicles which appear more evident when the canal is filled with air (Zinn;) these fascicles are connected with the serrate prominences of the retina. Since Winslow's time, this zonula is derived from a splitting of the hyaloid membrane; but the following observations are opposed to this opinion: 1. The hyaloid membrane has such a thickness, that it cannot be divided into two layers, as Zinn had already observed. 2. The zonula has a quite a different structure; the hyaloid membrane has nothing fibrous. 3. The hyaloid membrane is at the posterior convexity of the lens not thinner than in the other regions of the vitreous. 4. Between the corona ciliaris and hyaloid membrane is situated at the continuation of the retina under the zonula. I have to mention last, the distribution of vessels in the zonula, which also proves, that it is not a continuation of the hyaloid membrane; the anterior part of the zonula obtains its vessels with the anterior capsuli of the lens; the posterior part of the zonula from the arteria centralis after its division upon the posterior capsuli of the chyrstalline lens, and forming here an anastamosis with the other vessels; and finally the zonula has been injected with the capsuli, but the hyaloid membrane has not shewn the least trace of injection.")

"The difference of function in the iris and ruyschiana, though they are the continuation of a serous membrane, I explain from the addition of other parts, as in the iritis of the ciliary nerves and vessels, to which, I think, the motion of the iris is to be attributed; and in the uvea and ruyschiana, from the other ciliary arteries, which secrete the pigmentum nigrum."

Mr. Stratford remarks, that the choroid coat "is beautifully soft and easily torn, while from its great vascularity it has been considered the centre of circulation within the eye. Some who have imagined that the tunics of the eye were a continuation of the membranes of the brain, have (while they considered the sclerotic to proceed from the dura mater) thought this derived from the pia mater. In its use it may in some degree correspond, but by administering to other and very important functions, it obviously claims a marked distinction. This tunic was described by Ruysch as consisting of two membranes; one, the outer, carrying and supporting the vessels; the other (which has been called, in honor of him, tunica Ruyschiana) is of a flocculent appearance, and secretes the dark pigment which we find on its inner surface. This distinction is scarcely perceptible in the human eye, but in that of some animals it is much more obvious: its existence has been altogether denied by some anatomists; I think, however, the distinction is warrantable, from the evident difference of their office."

"The outer lamina of this membrane, then, is the proper choroid. It consists of a multitude of minute vessels, connected together by cellular tissue, and these would appear to carry the the red blood which is subservient to the secretion of the black pigment. This is of a brown color, and after death stains the neighboring surface of the sclerotic coat. On its inner surface are the branches of the posterior or short ciliary arteries, which form a net-work of great vascularity, and which in a fortunate injection appears of an universal scarlet color; they are very intimately connected to the veins which are without, and may likewise sometimes be shown by a successful injection from the superior cava. These are beautifully convoluted, and exhibit great exactness in the arrangement of their branches. Thus each capillary vein enters into a larger trunk, after making a very graceful turn, so that they have been compared to a tree with weeping branches, or to the fine curve of the waters of a jet d'eau, while from it they have also received the name of venæ vorticosæ; and these being collected into three or four larger trunks, pass through the sclerotic coat into the orbit."

"The Tunica Ruyschiana, also sometimes called tapetum, is the internal lamina, which, under the microscope, presents a fleecy appearance; this proceeds from the projection of an immense number of very minute villi, that secrete the paint we find covering its inner surface. Anatomists have not, from the minuteness of the structure, been able to discover any glandular apparatus; but from analogy, I am almost brought to consider that such must really exist; when washed of the pigment, its surface is of a brown colour; in very young subjects it is particularly red. This is also the case in the eye of the albino; but here I doubt that the tunica ruyschiana ever existed, and consider that an original deficiency of the formation of this part, is the cause of the absence of the pigment."

"The pigmentum nigrum, which is secreted by the Tunica Ruyschiana, lies upon it, and immediately behind the Tunica Jacobi. In animals we find it of a black colour, but in the human eye it has a brownish tint, and is therefore not inaptly (by the German anatomists) denominated Pigmentum Fuscum; its colour, however, varies in density in different individuals, while in some it is entirely wanting. It appears to be about the consistency of mucus, not merely placed upon the surface which secretes it, for upon examination we find that the next membrane is free from any tinge—but it must be covered by a very delicate cellular tissue; so delicate and fine that it is washed away with the pigment, by means of a little water and a camel's hair brush."

"This is the matter that occasions the jet black appearance we see, when looking into the pupil. In the albino and some animals it is absent, when the internal eye seems red, from the blood vessels of the choroid reflecting the rays of light. We also find that it varies in quantity at different times; thus in old age, at the commencement of some diseases, it is partially absorbed, when the bottom of the eye becomes more visible, and we are apt to mistake it for an opacity in some of the transparent media. Its use is evidently to stifle the rays of light that have produced their due effect upon the sensible retina, as I have explained, that in the phenomena of colours, all the rays of light are absorbed, excepting those that produce the tints: now in black none are reflected, a circumstance which directly proves the use of this pigment. The rays of light which enter the pupil, and strike upon the expanded nerve, having produced their intended effect, are directly absorbed; but was this colouring matter deficient, or in any degree absent, they would be reflected, and in all probability would produce a proportioned degree of confusion in the perception of objects."

"The outer surface of the choroid is united to the sclerotic coat by a fine and lax cellular tissue; it is also particularly connected at many points by the ciliary arteries and veins. The optic nerve, which passes through the sclerotic coat, also forms a band of very intimate connexion; and here the choroid coat forms around the cribriform plate a little monticulus, over which the fibres of the nerve diverging, are expanded into the retina. At the upper margin it also receives a firm attachment to the ciliary ligament, or general point of union of most of the internal membranes. Between the choroid and sclerotic coats we may also discover the long ciliary arteries, their corresponding veins, and can easily distinguish the ciliary nerves which accompany them, by their whiteness and size, for these run in parallel lines, at about equal distances forwards, to form the annulus gangliformis."

RETINA.

"Is the beautifully expanded extremity of the optic nerves, the seat of every luminous impression, and the most internal of those membranes denominated the coats of the eye. I have described how the optic nerves, (says Mr. Stratford,) arise in the brain, from the nates and testes, and thalami nervorum opticorum; how they proceed forwardly, having a connexion, and then diverging, pass through the foramen lacerum, and finally arrive at the posterior part of the eye-ball; how, after they enter the orbit, they are enveloped in membranes similar to those surrounding the brain itself, and said to be continued from them; how one is united with the sclerotic coat, while the others may be traced into the ball, along with the nervous fibres.

The optic nerve, just at its entrance into the globe, is very much compressed, as though we had tied a string tightly around it. This appears to arise from the fibres of the nerve being now closely connected and firmly supported, to ensure them a secure passage through the hard sclerotic coat. The fibres now pass through the cribriform plate, each fibre going through a separate foramen; and if in our examination, we remove the retina, and squeeze the nerve, we can distinctly prove this fact; for the nervous matter will protrude through minute pores: here also we find the fibres collected into a little amonticulus, or minute papilla, surrounded by a fold of the choroid coat, over which they spread out, and are finally expanded into the retina."

"The retina, so called from the nut-like appearance produced by its blood vessels, is said to consist of three separate coats, or layers. The middle, and most essential, is the nervous matter, delicately expanded between the other two. This, in the living subject, is perfectly transparent; but in dissection after death, we find it of a light grey tint, extremely soft and pulpy, consisting of minute corpuscules united by the cellular tissue. This matter lines the inner surface of the choroid coat, but is not directly connected with it. It passes forwards to within a short distance of the corona ciliaris, and terminating abruptly, we may observe a transparent portion between them. It seems partly deficient at the point where the nerve enters the globe; that is, the fibres at the monticulus do not receive sensation so acutely as the expanded matter of the nerve."

"The outer layer of this tunic would appear similar to the tunica arachnoides, both in consistency and office. Like it, we find it delicately thin and transparent; surrounding the outer surface of the nervous matter, separating it from the pigment of the choroid coat, with which this layer is in immediate apposition, and this too, instead of stopping at the corona ciliaris, as the nervous matter, passes forwards under the ciliary processes, and is then marked by their eminences, and stained with their paint, until it arrives at the capsule of the lens, over which it is reflected. Just before it arrives at the capsule, we find that it forms with the external tunic of the vitreous humour, the canal of Petit. This membrane was first described by the justly celebrated anatomist, Dr. Jacobs, of Dublin, who demonstrated its existence but a few years back. It is best discovered in an eye that has been kept a short time, where we may generally elevate it from the nervous matter, by means of a camel's hair brush and a little water. The inner layer of this membrane is denominated the tunica vasculosa retinæ: it is similar to the pia mater in the nature of its office, and like it, we find it composed of a delicate cellular membrane, supporting and connecting a tissue of blood vessels, which supply the nervous matter. The tissue is supplied with blood, by that branch of the ophthalmic artery called from its course the arteria centralis retina. It is a twig that passes forwards by the side of the optic nerve, pierces its inverting membrane a little posterior to the globe, runs between the nervous fibres until with them it enters the eye, and is finally expanded into this delicate net-work of vessels. If we make a section of the nerve, near to the eye-ball, we see its open mouth forming a hole, which by the ancients was called the Porus Opticus, and considered to fill some very important office in the phisiology of vision. The artery having passed through the cribriform plate, we find it distributed with very great minuteness upon the inner surface of the nervous matter: many of the vessels carry red blood, and are visible to the naked eye; but the far greater number convey a serous fluid, for the nourishment of this delicate apparatus. Some of these vessels go forwards, to inosculate near the ciliary processes, with the termination of the short ciliary arteries, and here having received a considerable augmentation, many of its nervous branches go forwards to supply the lens and its capsule. These in health are perfectly transparent; but during disease I have distinctly seen them extending themselves upon the capsule of the lens. The veins which return the blood correspond with the arteries, being collected from their minute terminations into larger trunks, pass backwards through the cribriform plate into the orbit. It is them we so distinctly see, in our examination of this membrane after death, they being generally filled with blood, while the arterial branches are quite empty. We should now look well to the delicate vascularity of this layer and its connexion with the nervous matter; for unless we give this point due consideration, we shall not be able rightly to comprehend the diseases to which the retina is liable."

"We find on our examination of the eye-ball, that the optic nerve does not enter in the axis of vision, but pierces the selerotic coat at an angle upon the nasal side, which we find is exactly opposite to a spot deficient of sensibility to the impression of the rays of light; but about two lines to the outside of this, we find, upon the internal surface of the retina, a little yellow spot, seen only in the recent eye, exactly in the axis of vision, and surrounded with several folds of the membrane, and in its centre we observe an appearance which has been described as an irregular foramen, more marked in childhood than in age. This is called the foramen of Sœmmering, he having described it in the year 1791. Having made an injection of the recent eye, we may observe this yellow spot surrounded by the arteria, and vena centralis retina, as a delicate vascular corona. This is supposed to be the most sensible spot on the surface of this membrane, and to receive with most perfection the impression of surrounding objects."

LIGAMENTUM CILIARE.

"The ciliary ligament is a kind of greyish ring, seated at about the distance of a line and a half from the external circumference of the cornea; it is thick, particularly at its upper margin; is from two to three lines in breadth, and appears of a pulpy texture. Here we find is the general connexion of almost all the internal tunics, which are united to it by the firm sclerotic coat; at the lower margin is the choroid, upon its superior edge is placed the iris, and between the two the ciliary processes adhere to it."

"The ciliary nerves passing up between the sclerotic and choroid coats, are said, when they arrive at this point, to form a plexus or general union of nervous twigs, which has been named by Sœmmering, the annulus gangliformis, which afterwards sends out minute and delicate fibres, to regulate the action of the iris. That such a ganglion really exists, I am led to doubt, from observing upon the division of these ciliary nerves, that the pupil becomes permanently and largely dilated at the point supplied by the wounded nerve, a fact which, although it may throw some doubt upon the case, does not entirely disprove the idea. The student should be particular to mark this spot, for it is necessary to avoid it in our different operations behind the pupil; for should we happen to wound this general bond of connexion, we might do immense damage, setting aside the fear of wounding this centre of nervous influence. He should also observe the exact spot at which the long ciliary arteries pierce the ligament, for although a wound of them would not be very dangerous, it is as well we avoid them."

CILIARY PROCESSES.

"This is a beautiful little circle placed posterior to the iris; it is considered by some to be a continuation of the choroid coat, which they represent as plaited at the angle of its inflection, to allow of its accommodation to this part of the globe. It certainly bears a great resemblance to it, in texture and vascularity; but as it is easily separated from it, and is evidently placed here for a particular and useful purpose, I think it better to consider them distinct. If we divide the eye longitudinally, and remove the cyrstalline and vitreous humours, we shall see the smaller extremity of these processes which are in apposition with the capsule of the lens, floating loosely, while we may also observe the firm attachment of their external margin to the ciliary ligament. We likewise find that these folds of membrane are radiated like the disk of a flower, having a lesser light-coloured circle included within a larger and darker one, presenting an appearance that has not inaptly been termed the corona ciliaris. In the uninjected state they are loose and flaccid; but when their vessels are filled, we find them of a scarlet colour. Their vessels proceed principally from the ciliary arteries, which having supplied the choroid coat, now advance in great profusion to the ciliary processes, endowing them with a like vascularity, while the veins are also connected to the venæ vorticosæ. Upon the inner surface these processes have a layer of colouring matter, similar in character to the pigment of the choroid, and iris; this is secreted by an appropriate apparatus, from the innumerable quantity of minute vessels which I have mentioned. In number these processes vary from sixty to eighty, are about the length of a line and a half, alternately longer and shorter, assuming the appearance of a triangle, with the base in connexion with the ciliary ring, and the apex pointing towards the lens. Now if we inspect the corresponding portion of the vitreous humour, we shall see the mark of their adhesions, and may observe some slight depressions of the membrane to which they were attached; these correspond in depth to the elevation of the fold, and are stained by the same fuliginous paint, so that they are often mistaken by the student for the processes themselves. The use of this plaited membrane is another instance of the beauty and perfection of the organ; for, supplied by the black pigment, and assisted by the frequent folds, it entirely prevents the admission of the rays of light around the circumference of the lens, which if allowed to pass, would, in all probability, from not receiving its due degree of refraction, confuse and render vision indistinct."

"M. le docteur Ribes has advanced a theory, that these processes secrete the aqueous and vitreous humours: that the aqueous humour is formed by them would appear probable; but that the vitreous is, I consider, from the nature of its conformation, to be far from correct."

HUMOURS OF THE EYE.

The humours occupy the internal part of the eye-ball; they give the spherical shape to the globe. Mr. Stratford says, "the humours of the eye are those transparent media, which, filling up the interior of the ball, give the due support to its several coats, while they also serve many very necessary purposes in the physiology of vision. The first is the aqueous, situated in the anterior part of the globe, perfectly fluid, to permit the free actions of the iris. The second, the crystalline, which is particularly instrumental in the refraction of the rays of light, and is placed immediately behind the aqueous humour. While the third is the vitreous, occupying the posterior part of the globe, formed of an aqueous fluid, separated by many sapimentæ into little cells, which give it a sufficient degree of resistance to support the expanded coats of the eye."

AQUEOUS HUMOUR.

Mr. Stratford says, "the aqueous humour is that transparent fluid that fills up the anterior chamber of the eye, formed by the posterior surface of the cornia on the one hand, by the anterior capsule of the lens and ciliary processes on the other. It is a clear, transparent fluid, slightly viscous, about the specific gravity of 1009. It has little smell or taste; is slightly coagulable by boiling; and is inferred by chemists to consist of a large proportion of water, small quantities of albumen and gelatine, combined with some neutral salts. Its averaged quantity in the adult weighs about five grains, while in the eye of the fœtus, we find it slightly bloody in appearance, and estimated at a grain and a half. The iris, which hangs perpendicularly in this fluid, moves with great freedom, and in a healthy state of the eye, not the least vaccillation or tremor is perceived, as a consequence of its action; and thus situated, it is said to divide this space into the anterior and posterior chambers of the aqueous humour. The dimensions of the chambers were first demonstrated by M. Petit, who, freezing the eye, fully proved their disproportion. He found the piece of ice occupying the anterior chamber considerably larger than that situated in the posterior, which was a thin pellicle of about one-fourth its size."

"The chamber of the aqueous humour is by some said to have a serous membrane reflected over its surfaces." (*Membrana humoris aquei Wrisbergi.*) "The existence of which is easiest shown in eyes of aged persons. This membrane can be separated from the innermost layer of the cornea, and differs from it in its greater tenacity and transparency. The latter quality it preserves in spirit; the greater firmness and more express character of a serous membrane distinguish it from the layers of the cornea; it is not so liable as these to ulcerate, or to be destroyed by an ulcerative process, and, therefore sometimes protrudes and forms the disease called by Professor Beer, 'Keratokeli.'" "This has been disputed by many very excellent anatomists; but analogy will, I think, lead us to conclude that it certainly exists. Now we find every cavity of the human body containing a serous fluid, to have its proper capsule, without which it might be extravasated into the surrounding cellular tissue; moreover, wherever motion is permitted in any of these cavities, such a membrane seems indispensable, so that, although anatomical demonstration will do but little to decide this point, I apprehend the above circumstances will permit us to conclude, that the membrane of the aqueous humour, which must be exquisitely delicate and fine, is reflected over all the surfaces with which that fluid is in apposition."

"The source of the aqueous humour has long been a subject of discussion. Some say that it is the ciliary processes which give it out: others, that it is the thinner particles of the vitreous humour, which transude through its membranes, and so fill the anterior chamber of the eye; while a third affirms, that it proceeds from the transparent membrane of the aqueous humour. I would consider it most probable, that it was secreted by this membrane, only, however, those portions of it which cover some part supplied with considerable vascularity. The ciliary processes are undoubtedly one of the most vascular surfaces in connexion with the anterior chamber of the eye, and this fluid must, from its very quick secretion, require some points endowed with very considerable vascularity; for if we puncture the cornea, and permit it to escape, we find it regenerated in four-and-twenty hours: these, then, are perhaps one of the sources of this secretion, while a fact stated by Mr. C. Bell, seems to militate against their being considered the only source; for he directly affirms, that he has found a fluid, in the anterior chamber of the aqueous humour, in the fœtus. Here the membrana pupillaris forms a direct partition between the two cavities." (If in a complete closure of the pupil, the aqueous humour of the anterior chamber is discharged by an incision of the cornea, we will find it reproduced: how? not by the passage of the humour from the posterior chamber through the pupil. I would answer that it is regenerated by the proper secerning vessels of that portion of the serous capsule which lines the anterior chamber. This serous membrane, in my opinion, envelopes the aqueous humour like the shell of an egg, encompassing the soft parts.) "Being coeval with the formation of the eye, it ought entirely to exclude the aqueous humour from the anterior chamber, if it is secreted by that portion only which covers the ciliary processes. We find, however, that the iris is a very vascular tissue; and if the membrane which covers it be but endowed with the necessary apparatus, this is fully competent in every point of view to its secretion."

LENS AND ITS CAPSULE.

The crystalline lens is that transparent body placed upon the anterior surface of the vitreous humour, embedded, as it were, in its substance; it is surrounded by a beautifully pellucid capsule, which serves to retain it in its proper position. The lens is formed by very thin concentric lamina, superadded upon each other, and surrounding a harder neucleus. The more external of these layers are soft, and easily removed: but the nearer we approach the centre, they appear to become more condensed and firm in their texture; so, that as a necessary consequence of its formation, we find it considerably thicker in the centre than at the circumference: we should also observe, that the lens is doubly convex, and that in its posterior surface this is more marked than in its anterior. The composition of the lens, chemically examined, seems to differ but little from the other membranes. We find, however, that it is of greater specific gravity, about 1100, and that it has a considerably larger proportion of albumen and gelatine in its composition, as we should naturally infer from the greater density of its substance. It is firmly coagulated by boiling, and the action of acids. A fact curious in the formation of the lens is that, by the action of heat, it is separated into three equal divisions; this is a separation of its fibrous texture, and no proof of its muscularity, as Dr. Young was ingeniously led to consider. The lens is contained in its proper capsule, which is firmly connected to the surrounding texture. This capsule is described by some anatomists as formed by a splitting of the external membrane of the vitreous humour; but this is a lamina so very thin and transparent, that I apprehend it would not be strong enough to confine the lens in its situation, but would be ruptured by every motion of the globe; moreover, if we compare the relative density of the two layers, we shall find the capsule considerably thicker than this membrane before it approaches the lens, which must at once convince us of the fallacy of this conclusion. I would consider the capsule of the lens as a distinct transparent membrane, forming a sack without an opening, and firmly connected and surrounded by the adjoining textures; indeed, so firm is the structure, that it was considered by Haller to resemble the cornea: it is strengthened on the fore part by a reflection of the Tunica Jacobi, which having surrounded the proper matters of the nerve, is continued forwards, and connected to the ciliary processess; on its anterior surface we find a mark corresponding to each, it is also here firmly united to the other membrane of the vitreous humour, at a short distance anterior to the capsule: these layers separate, the anterior proceeds forwards, and is reflected over the capsule, to which it is very intimately connected, serving to maintain it in its proper situation, while the Tunica Hyaloidea is situated immediately behind it, and performs a similar office; between the strong adhesions of these two layers, and their reflection upon the capsule of the lens, we find a cavity denominated the canal of Petit, or, by the French, the canal godronné: this is regularly crossed by little transparent fibres, passing from the union of these layers to the capsule of the lens, and may possibly be the transparent vessels that go to supply the lens itself. This cavity is easily demonstrated by puncturing its outer lamina, and then inflating it with the blow pipe; the air passes easily around it, and elevates the membrane, at equal distances, into a kind of crown around the circumference of the lens. Within the capsule we find a minute quantity of fluid, which surrounds the lens, and has been called the liquor Morgagni, and is, perhaps, to permit some motion to the lens. I have already described, that I think it probable a very minute serous membrane is reflected upon the anterior surface of the capsule, so I would conclude, and for the same reasons, that its internal surface partakes of a similar character."

"It has been said that the lens is not supplied with blood vessels, that it is only a deposition from the liquor Morgagni, by which it is surrounded; that this is not the case I am convinced, and I am sure I shall be supported by every rational and thinking mind; for as the lens is formed, by an infinite wisdom, for a particular and useful purpose, so must it be supplied with vessels which nourish and connect it with the general system, supporting it in that combination of actions which is a proof of its vitality. In the healthy eye we find it perfectly transparent, but when separated from its connexions, it soon becomes opaque, and is eventually absorbed: this will stand as a proof that it possesses life, and will go a great way to convince us that it has vessels passing from the capsule to the circumference. These, when ruptured, leave the lens as a foreign body, similar to what anatomists would have us to believe was its natural condition. The vessels which supply the capsule I have often seen circulating on its surface in the living eye during disease; in their natural state, however, they are perfectly invisible, being minute serous twigs from the arteria centralis retinæ, the branches of which having supplied the retina, and arrived at the ciliary processes, inosculating freely with the short ciliary arteries, as serous vessels go forward through the canal of Petit, giving off minute twigs as they pass along, which are distributed to the capsule of the lens; the main trunks, I imagine (for I confess anatomical demonstration does not throw the least light upon the subject,) pass forwards, at regular intervals, through the liquor Morgagni to supply the lens itself. The twigs also of the central artery, which are distributed to the vitreous humour, are reflected upon the posterior surface of the capsule, forming minute inosculations with the former vessels. I would also conclude, that these arterial branches had veins corresponding to them, which returned the superfluous quantity of the fluid transmitted by the artery, while they also absorbed the débris of animal matter to be thrown out at the system.

The crystalline lens would appear to be similar in use, but more perfect in formation, than the opticans' lens; like it, we suppose, it is placed behind the aperture or pupil, to refract or concentrate the rays of light, so that they shall impinge with due precision upon the sensible apparatus in this delicate organ; when the lens is absent we find the sense confused, but are, in some degree, able to remedy the defect by the use of glasses."

VITREOUS HUMOUR.

"The vitreous humour is that beautifully transparent body which is situated in the posterior chamber of the eye, is surrounded by its several coats, and gives a degree of support to its globular form, that renders this one of the most interesting and delicate organs in the body; it occupies three-fourths of the globe, is of a spherical figure, excepting on its anterior surface, where we may observe a depression, marking the situation of the lens: it is soft and jelly-like, consisting of a fluid, in many very minute cells, surrounded by a delicate transparent membrane, called the tunica hyaloidea. It lies in connexion with the vascular coat of the retina, is united to it but at one point posteriorly, where a branch of the artery passes into its substance, while we find it firmly connected anteriorly to the tunica Jacobi and the capsule of the lens. According to chemistry, it varies little from the aqueous humour, excepting that it contains a larger proportion of the albumen and gelatine, its specific gravity is about 1016."

"The cellular texture of the vitreous humour was first pointed out by M. Demours, who, having frozen the eye, and cut into its substance, observed a great number of shining points, which he removed with great difficulty by the assistance of a needle, and found them to consist of wedged-shaped flakes of ice, firmly connected and supported by an excessively thin and transparent membrane. The vitreous humour thus demonstrated to be a body made up of an immense number of cells, containing an aqueous fluid, which, like the cornea, continually lubricates the sepimenta that surrounds it. This confirmation gives a degree of firmness and consistency that serves to support the surrounding texture, without, in any degree, obstructing the passage of the light to the bottom of the eye. The sepimenta which contain the fluid, I think, I have observed to run with great regularity in two different directions, which appear to cross each other, and to be particularly collected at the posterior capsule of the lens, which is firmly united to them. The source of the fluid contained in these cells is by some said to be secreted by the ciliary processes, and to pass backwards, to distend each little partition; but that this is not the fact, I apprehend its conformation will go a great way to prove; for in our examination of this body we find it retains its form, even after we have separated it from its surrounding connexions; and suddenly to empty it of its fluid, it is necessary to puncture each little cell: it may be said, that if we make an opening into this body, the fluid will gradually, after a time, exude: this, however, is no proof of the continuity of the cells, for the weight of the fluid may rupture the delicate lamina of each, and thus gradually empty the texture; was it a secretion from the ciliary processes, filtered into each of them, it would, in all probability, run out as soon as we had removed those bodies."

"In our description of the arteria centralis retinæ we described a branch to pass into the substance of the vitreous humour, forming its only union at the posterior part; this is visible in the eye of fœtus, and conveys red blood, but in the adult it ceases to contain the red globules, and admits but a serous fluid to pass along its course. This twig goes forwards on the outside of the axis of the eye, as I conceive to be minutely subdivided into invisible twigs, some of which must be sent to each little cell, and ramifying upon its walls, must give out the secretion which serves to distend them. Even the existence of this artery has been doubted, but allowing that the fluid is formed by the ciliary processes, we must have some minute transparent arteries and veins, which enter into the vitreous humour, to nourish its sepimenta, and connect it with the general system."

"The use of the vitreous humour is to distend and support the surrounding tunics, and to keep them at a proper distance, so that the rays of light being duly refracted, may be able to converge and strike upon the sensible part of the retina, while its cellular conformation may be intended to prevent any vibratory motion in a fluid so nearly connected to the immediate seat of every lucid impression."

We have transcribed Mr. Stratford's most important parts of the eye; it would be well now for the reader to examine the plates while his mind is charged with the subject, that he may obtain a better knowledge of the formation of the different parts of the eye, and its appendages.

DISEASES OF THE EYE-BALL.

CATARACT.

Whenever the pellucid lens or its capsule loose their transparency, the rays of light are consequently obstructed in their passage to the retina. Vision becomes abolished or partially impaired according to the extent of morbid action in the crystalline body. This disorganization in the lens or its capsule was denominated by the Greeks, Cataracta Glaucoma, the Suffusio of the Latins. In days of yore, we discover this disease created much professional interest, and its nature and character was but little understood. It moreover appears the ancients, and among them Hippocrates, speaks of the cataract as a complaint of the lens:—"no sooner had Galen promulgated the doctrine of the lens being the immediate organ of sight, than the correct opinion of the ancient founder of medicine began to decline, and for many years afterwards had no influence in practice. In fact the seat of the cataract was entirely forgotten, till about 1656, when first, Lasnier, and afterwards Borel, Bonetus, Blegny, Geoffroi, &c. revived the truth which had been so long extinct, and they and a few others believed, that the disease was situated in the crystalline lens." The majority of physicians however were still unacquainted of this truth, until the beginning of the eighteenth century, but the several remarks promulgated by Maltre-Jan, Brisseau, St. Ives and Heister, made the fact generally known. "In 1708 the celebrated M. Mery, who had hitherto joined in the belief that the cataract was not a disease of the lens, communicated to the Academy of Sciences a memoir, in which he acknowledges the correctness of the statement made by Bresseau, and Maltre-Jan, that vision can take place without the assistance of the crystalline lens; and he recommended a clergyman who had a cataract, to have the lens extracted, which was successfully done by M. Petit."

The precursory symptoms of disorganization taking place in the lens or its capsule are obscure. If an individual is asked how his vision became defective, he answers that he could not explain any particular cause which impaired his sight, saving that when he first found his vision becoming imimperfect he could see moats, black or different coloured spots, constantly in motion before his eyes. In fact the disorganization of the lens will steal upon some in such an insidious manner, and so quickly too, that they are hardly aware of its existence or primary stage, until the crystalline body is discovered opaque, or the pupil presents some discolouration from its former jet black aspect. Being therefore a complaint of slow formation in the majority of cases, its influence upon vision should be well understood to prevent the infantile stage from being confounded with the incipient symptoms of amaurosis, and this may be done, by a close inspection of the pupil, previously dilated largely with bellodonna, and if the slightest morbid action has taken place in the lens or its capsule a speck of a leaden white pearl colour will be seen, either situated in the centre of the crystalline or at its edge. This can be better accomplished and with more certainty, by using a magnifying glass. In making this disquisition a good light from a northern window should be allowed to fall upon the eye, and I conceive if any man has had any conception of the former transparency of the crystalline body, he can now detect the least disorganization going on in it.

Professor Beer "divides cataracts into true and spurious. The true is within the capsule; the spurious is placed between it and the iris. The principal kinds, according to his discription, are the following."

"True.—1, Lenticular; 2, Anterior Capsular; 3, Posterior Capsular; 4, Morgagnian; 5, Capsulo---Centicular; 6, Cystic; 7, Silignous; 8, Cataract with a cyst or sac, containing puss; 9, Trabecular.

Spurious.---10, Lymphatic; 11, Parulent; 12, Sanguineous; 13, Pigmentous:"---Dr. Vetch gives us the following description of the different cataracts. "He says the first important distribution of the different forms of cataract, is into real and false."

"Every visual obstruction," (observes our author,) "which exists in the posterior chamber, between the vitreous humour and the uvea, must lie either within the boundaries of the capsule of the lens, or between the anterior capsule and the uvea. When opacity occurs in the first situation, it is called real or true cataract, and in the latter, false cataract, depending upon the presence of some adventitious matter; the first is a primary diseased appearance, the latter arises from previous and more extended inflammation."

"True cataract is again to be subdivided into lenticular and capsular; the first begins in the centre of the lens itself: for the most part it exhibits a dark grey colour, with a tinge of yellow, and remains darker in the centre than at the border of the pupil, even when the whole has become opaque, so that the cloudiness appears to diminish gradually towards the border af the iris, where a darkish ring may be observed, and which proceeds from the shadow of the cataract. The growth of this cataract is very slow; it has no influence upon the expansion or contraction of the iris, and even when completely formed, is not altogether destructive of vision."

"As the patient continues to distinguish many objects when presented laterally or in the shade, or when the pupil is artificially expanded, this cataract, commonly, remains at a considerable distance from the iris, the space of the posterior chamber is, therefore, very distinctly seen, the form of the cloudiness is more or less convex, and without spots."

"Capsular cataract, a term sometimes mistaken for the membraneous or false cataract, seldom begins in the middle of the pupil, but in one or more points towards its border, in the form of white shining streaks or spots; its colour though clear, is never uniformly deep, and it more or less influences the motions of the iris; this cataract seldom remains long without some opacity of the lens taking place, which may easily be comprehended from what has been already said on the connection of the lens and its capsule. Cataract of the capsule may be confined to the anterior or posterior half, or both hemispheres may be opaque. I shall briefly enumerate the several varieties as distinguished previously to an operation."*

"1st. Anterior capsular cataract is a frequent disease, though it seldom continues long without inducing an opacity of the lens also; when it has become perfectly formed it attracts notice by its clear grey colour, studded with white shining spots, like chalk, or mother-of-pearl; as the capsule is thicker than in its sound state, it diminishes the posterior chamber, and sometimes even pushes itself close to the uvea, when the motions of the iris are considerably impaired, and vision is reduced to a mere sense of the presence of light."

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* It would not be easy to comprehend how one half of the capsule could remain permanently cluody without the other, if we did not know that they were supplied by different vessels.

"Cataract of the posterior capsule is comparatively a rare affection, and is quickly joined by opacity of the lens, and can therefore seldom be seen when fully formed; in its early stage, it is to be distinguished by a whitish grey colour, partially distributed, but without the clear pearly white spots which appear in the cataract of the anterior capsule; we can, however, clearly discern, that the cloudiness behind the pupil is concave, and as long as the lens does not participate in the disease, the patient is able to distinguish objects with considerable accuracy, especially with a magnifying glass."

"Perfect capsular cataract presents the usual appearances of the anterior capsular cataracts, and the extent of the disease is not always ascertained before the operation. The iris is, for the most part, very immoveable, in consequence of the cataract pushing up against the uvea, and it often requires artificial expansion of the pupil to convince us that a union has not taken place between these parts. Another form of true cataract has been called the *cataracta morgagniana*, which, however, very seldom exists by itself, being quickly followed by opacity of the lens and capsule; it is described by Professor Beer as of a blue milk and water colour, the whole pupil appearing cloudy; but the clouds alter their form or outline when the head is moved quickly, or when the eye is rubbed by the finger through the eyelid, the posterior chamber is much diminished, but the patient discerns objects of magnitude with tolerable ease."

"True capsulo-lenticular cataract is the most frequent form of disease, and consists of many sub-species and varieties.

"1st. As characterized by various configurations of the anterior capsule, this cataract attains a very great size, and generally comes close up to the uvea, partly of a chalk white colour, and partly like mother-of-pearl, disposed in layers, the latter being larger and lying higher than the former; the iris has very little perceptible motion, contracting and expanding very slowly. Although the pupil remain perfectly round, the posterior chamber disappears, and even the anterior is somewhat diminished by the size of the cataract pushing the iris towards the cornea. This form of the cataract has been sub-divided into species of varieties, as the *cataracta capsulo-lenticularis marmoracea*, in which chalk-white stains predominate;—*fenestrata*, when these cross one another, so as to leave interstices of a darker colour; *striata*, when the streaks of the anterior capsule concentrate in the middle of the pupil; *centralis*, when it consists of a single elevated spot in the centre, the rest of the capsule and the lens remaining tolerably transparent, with the exception of a pure white spot in the centre; this cataract Professor Beer says, he has observed in children soon after birth, and that it remained unaltered during the whole period of life; *punctata*, when several elevated spots appear over the surface of the anterior capsule; *dimidiata* when one half is white and slightly elevated. According to the appearance assumed by this lymphatic deposition, different names have been given to it; as *traberculavis*, when it passes across the pupil like a beam; *pyramidata* when a conical projection rises from the centre of the anterior capsule, projecting into the anterior chamber. In all these varieties, and indeed in almost all kinds of capsular cataract, the lens is found more or less soft or fluid, while the external appearances depend upon the thickening of the anterior capsule.

"II.—*Cataracta capsulo-lenticularis cystica* is characterized by its pure white colour approaching close to the uvea, and receding from it, according to the position of the head, and in time becoming tremulous. On the nature of this cataract, Professor Beer remarks, that it is liable to be produced by violent concussions, or to exist as a congenital disease, and that in such instances he has found the capsule a full line in thickness; the lens itself is dissolved into a watery or milky fluid, the quantity of which is never equal to the bulk of the solid lens. In this cataract there is an evident loss of adhesion between the capsule and the neighbouring parts, even when the tremulous motion is not evident, as the whole cataract springs out as soon as an adequate opening is made."

"III.—*cataracta capsulo-lenticularis siliquata*, so called from the tough husky state of the capsule, the cataract of infants so ably described in the posthumous works of Mr. Saunders; this cataract may be congenital, but is more frequently formed soon after birth, and is also met with in adults. The state of the lens and capsule varies at different stages in consequence of the partial absorption of the lens; the experience of Professor Beer confirms the inferences so ably drawn by Mr. Saunders and Dr. Farre; he describes the lens, even in children, to be much diminished in size and sometimes scarcely perceptible, the capsule tough and shrivelled; this diminution of the lens is now understood to be the effect of absorption, which leaves the two layers of the capsule almost in immediate contact with each other. This cataract, there can be little doubt, is the effect of obscure inflammation most probably excited by exposure to a strong light soon after birth. In adults, it may originate in consequence of wounds or concussions of the eye; it will often appear at a considerable time after the blow of a whip on the eye, or the rebounding of any hard substance upon the cornea. There is, generally, much loss of adhesion between the capsule and the neighbouring parts."

Professor Schmidt says, "he has generally observed it in children and young persons who have been subject to convulsions in their childhood, and he ascribes its formation to this cause; Beer, with more propriety, considers the cataract and convulsions to arise from the same source of irritation, as it is often met with when no appearance of convulsion has ever occurred. In children, cataract has a light grey whitish colour, and is seen at a considerable distance from the pupil. In adults, it is of a more dazzling white, rather flat than convex; it is at a distance from, and does not affect the motions of the iris."

"IV. *Cataracta capsulo-lenticularis, cum bursa ichore continente*, known by a dark lemon colour, indolent iris, and diminished posterior chamber, for the most part occurring with a cachetic habit of the individual; the matter is contained in a cyst between the lens and posterior capsule, and has been often extracted entire along with the capsule by Beer and Schmidt."

FALSE CATARACT.

"I.—Adherent cataract, contracted vision in consequence of a new formation between the uvea and the lens, is generally the product of proceeding inflammation, which has had its seat more or less in the iris and the capsule of the lens, and is therefore frequently associated with some degree of capsular cataract. The patient bears evident marks of previous inflammation, by the diminished size and angular appearance of the pupil; vision is lessened in a greater degree than is accounted for by the extent of the new membrane, in consequence of some further injury occasioned by the inflammation. As has been already observed, the lymph which has been thrown out by the inflammation has a delicate cobweb appearance; sometimes there are opaque spots on the capsule, without any general loss of its transparency, but with the vision very considerably impaired. The pseudo membrane may sometimes be seen organized with red vessels, if viewed through a magnifying glass.*

"*I may here observe that the most complete *autopsia* is obtained by making the patient examine his own eye by means of a small metallic reflector, with a circular aperture in the centre with this the motions of the iris, and the state of the pupil can be seen in a truly beautiful manner."

"II.—Another species of false cataract is occasioned by a portion of the tapetum of the uvea becoming detached and laying itself upon the anterior capsule; this is almost always the consequence of violent concussion, occasions a great diminution, and a very uncertain degree of vision; unless the eye be examined in different lights and in different positions, and with the assistance of a magnifying glass, the detached portion of the uvea may escape observation. In giving a prognosis in every case of impaired vision after a blow, we must keep this accident in our recollection; if the patient be young, it may sometimes disappear without being detected; in more advanced periods we cannot hold out any such expectations, if the accident is followed by inflammation or dislocation of the lens, it will be accompanied with some appearance of organized lymph, as in the first species of false cataract."

"Besides the various appearances which cataract exhibits, accordingly as it occupies the lens or its capsule, another important classification arises from the degree of consistence under which it exists. As a knowledge of this must have great weight in determining both the operation and the modifications of its several manipulations, I shall recapitulate such appearances as mark the probable condition of the disease with regard to consistence."

"1st. Hard cataract is, for the most part, of rather a dark colour, and at a distance from the pupil; the motions of the iris are free, and the vision tolerably distinct when the pupil is expanded. These are the symptoms of true lenticular cataract already described, which is the only perfect species of hard cataract; it is chiefly met with in slender persons, who after a youth of temperance enjoy a vigorous old age; the lens is often much wasted, and what remains is nearly as hard as wood, of a chesnut brown colour, and flattened on the sides. This is evidently the effect of rigidity, or the diminished capacity of the absorbing vessels."

"2d. *Cataracta nigra.* This cataract is often mistaken for incipient amaurosis, but is ascertained by dilating the pupil."

"Soft or cheesy cataract has for the most part a greenish white or light greenish colour, with great privation of sight and indolent iris."

"Speaking generally, we may say that in young people, in cases of capsulo-lenticular cataract, the lens is soft; yet as true lenticular cataract is not always hard, even in very old people, so the cataracts of young persons are not always soft; when cataract forms under any marked constitutional affection, it is, for the most part, soft or cheesy."

"3d. *Fluid cataract.* This being always joined with perfect opacity of the capsule is, in general, not discovered with any certainty before the operation. Congenital cataract is always fluid at first. In *cataracta cystica*, already described, the quantity of fluid is not in proportion to the natural size of the lens. In fluid cataract, generally speaking, the size of the cataract is larger, instead of being smaller than the natural lens."

OF THE COMPLICATIONS OF CATARACT.

"The adhesion of the capsule to the uvea is seldom difficult to recognize, for the pupillary border of the iris is not perfectly round; it is not only more angular, but the cataract lies quite close to the uvea; the motions of the iris are more or less indolent, and when the adhesion occupies considerable space, they are even wholly lost; the sensibility to light is very indistinct, such preternatural cohesions being always the product of a preceding internal inflammations which, besides the opacity of the lens and capsule, may have produced other essential changes, in the retina, and the coat of the vitreous humour. We can ascertain the extent of the adhesions of the anterior capsule by the artificial dilatation of the pupil; but those of the posterior capsule with the coat of the vitreous humour, or of the capsule with lenticular cataract, especially if combined with considerable adhesion of the anterior capsule to the uvea, can only be recognized during the operation; other local complications of cataract are recognized much more easily, *viz.* as connected with anterior synechia, with a permanent contraction of the pupil without posterior synechia, with atrophy and with dropsy of the eye, with ophthalmia, and with natural spots and cicatrices of the cornea: all these morbid states of the eye are so characteristic, that they cannot escape even the most careless observer.

"Nor is a cataract joined with glaucoma difficult to detect; this cataract is always of a greenish color, it is externally large, so that it presses through the pupil to the cornea; the colour of the iris is almost as much changed as after iritis, and is perfectly immoveable; the pupil is much dilated and angular, generally towards the angles of the eye, the smaller ring of the iris scarcely visible, because it lies concealed behind the soft protruding lenticular cataract; the sensibility to light is entirely wanting; on the contrary, there are frequent flashes of light in the blind eye; and lastly, this cataract seldom exists without more or less varicosity of the external vessels of the eye. Such a cataract for the most part appears after violent and long continued head achs."

"It is more difficult to ascertain the existence of incipient *synechesis*, or simple destruction of the hyaloid membrane, which forms a more frequent complication; yet if this morbid state of the vitreous humour, which unsuccessful operators find very convenient, be formed in any very great degree; the marks are very easily recognized; the cataract trembles, and the iris undulates backward and forward, with the least motion of the eye seems somewhat atrophical, it is quite soft, and shews no resistance to pressure; the sclerotica immediately round the cornea, as in very young persons, blueish, and the sensibility to light varying; if the synechesis be not complete, there is only a suspicious softness in the eye, and a slight wavering of the iris."

"Another complication not less difficult to decide upon before the operation, is that with amaurosis; for although it may be easy sometimes to distinguish this complication, it is in many cases very difficult. When the pupil is very large, the iris is almost or altogether immoveable, and the person cannot distinguish day from night, and consequently still less the smaller variations of light; no power of diviniation is necessary, says Beer, to prognosticate with certainty the failure of an operation to restore sight to the patient; but if, on the contrary, the iris be nearly as moveable as in a sound state, the pupil as small as it ought to be in such a degree of light, if the patient can tell distinctly all the variations of light, and if the cataract, notwithstanding, be united to an amaurosis which deprives the patient of all power of vision except sensibility to light, it is only by a careful investigation of the history of the case, that we find out such circumstances as point out a simultaneous amaurotic blindness; the other eye being affected with amaurosis but not with cataract, excites a well grounded suspicion, than an amaurotic affection may be present in the cataractous eye also."

Inflammation of the capsule of the Crystelline lens.----It is, I believe, the general received opinion, that opacity of the crystalline lens is a disease, consequent upon inflammation of its capsule. Conceiving that a priviledge extends through all professions of vouchsafing to an author, the freedom of opinion and speech, provided his doctrines are not based upon jeapodous principles, which would likely mar and lead astray the young and credulous practitioner, who commonly seeks information from publications. The few remarks which are offered here, I hope will be viewed as kens of speculation, and opinions which have recently occupied the better part of my mind: it is well known to many professional gentlemen that this opacity of the lens has been a source of professional investigation and descrepency of opinion.

The prejudice of education will root deeply in the mind of one individual, opinions, over which, a multitudinous parade of facts and anatomical proofs, have but little power to remove, another espies a new beacon on the shoals of science fascinating and sparkling in its course—wafting gently and apparently to the pinnacle of true pathology, he pursues it until it vanishes, left now in a barren field to feast upon his own folly. However, should it be said that I have ventured too far upon the ocean of hypothesis, I hope my opinions will be looked upon as laudable.

Professor Walther of Berlin "thinks that cataract is the primitive and natural state of the lens, and that conjenital cataract is therefore not an altered but an unaltered condition, in consequence of a check given to the developement of the embryon. Like other malformations, it is not owing to the influence of any active or formative cause, but having been originally present in every embryon at certain periods of its existence, does not disappear in its progress to a more perfect state, as it does, when this progress is unchecked. The three months fœtus has a hare lip, and but one cavity for the mouth and nostrils. The iris is imperforate, and so are all the apertures of the perfect body. The eye-lids are fastened together over the naked eye, and the cavity of the umbilical cord being one with the abdomen, exomphalos is the natural and original state."

Traverse says, "Walther considers cataract to be the result of inflammation of the capsule, acute or chronic. By a powerful magnifier he has discovered a wreath of vessels about a quarter of a line distant from the pupillary edge of the iris, forming a concentric circle with the pupil. To this vascular wreath vessels pass in radii from the circumference of the capsule, and into the posterior surface of the iris. Nay, a net work of more delicate vessels is described to have been seen deeper seated in the lens itself, 'the larger trunks of which are not always derived from the circumference of that body, but evidently come from its posterior surface directly forwards, and then divide into branches.'" (Mr. Traverse here quotes the words of the Analysis in the Quarterly Journal of Foreign Medicine and Surgery.) "This is an appearance entirely morbid, the same authority deciding that there is no organized connection between the lens and its capsule in health, and that the lens is nourished by inbibition or absorbtion of the humour morgagini, secreted by the vessels of the capsule, into which it again deposits its waste, being merely furnished with absorbent and exhalent vessels. Hence inflammation of the lens is always secondary to that of the capsule, in the same manner as inflammation of the capsule is secondary to that of the iris; spots seen in the capsule, whether grey or brown, are, we are told, deposits of lymph, in which the prolonged vessels are seen terminating."

"The inflammation of the capsule and of the lens, are described as diseases marked by certain signs and appearances. The latter is always chronic like that of the bones, cartilages and fibrous textures. When the disease is established, the blood vessels of the lens and capsule become varicose. The firm cataract is the termination of inflammation in induration. The milky exemplifies suppuration. The dry siliquous or shrunk cataract, is a dry gangrene. The hard cataract when occurring without inflammation is a scirrhus, and purulent may sometimes be the effect of ulceration of the lens; other cataracts are considered to be sarcomatous." Mr. Traverse remarks, "The first part of these observations, namely, that referring to the appearances exhibited in inflammation of the capsule from its consistency and analogy with the phenomena that are open to observation, has been anticipated in the way of hypothesis, and may be admitted with proper allowance for the chances of optical delusions in the employment of a sextuple magnifier. But unfortunately, the enthusiastic devotion to system, which the author betrays in his pathological notions (which are to my seeming pure nonsense) gives an air of marvele to the whole story."

Blows inflicted upon the forehead or over the eye, the over exertion of the body, intense application to books by candle light, leading a sedentary life, fumes of acids, or the strong light from heated bodies, &c. are considered as frequently giving rise to cataract. Baron Wenzel discovered cataracts to be a disease more common among individuals exposed to strong fires, as smiths and glass-blowers. We may have the desease originating from abdominal or thoracic irritation. Cataracts have been known to run through families, becoming a hereditary complaint, or they will appear as the harbinger or effect of some constitutional malady, as scrofula, scurvy, syphilis, &c. The different consistencies of cataracts described by authors, I conceive, is entirely owing to the peculiar quality of the fluids or solids of the constitution of different individuals at the time they are attacked with cataract, which causes the peculiar colour and quick disorganization of the crystalline body in one, and the protracted manner in which it is evinced in another.

Satisfied that the internal parts of the eye-ball have proper lymphatics which perform in this organ the same functional office as in other parts, nevertheless, the researches which have been made by very able anatomists none have been clearly and satisfactorily detected; however, these absorbents might have been sufficiently developed, but the situation of them and their peculiar aspect, precluded the possibility of even satisfying the mind of the proficient demonstrator, that they existed in the organ of vision.

It is a physiological fact sufficiently proved, that in what ever part of the animal body secerning vessels are known to exist, or vessels which convey to a part that fluid necessary for its growth and composition, there must then be present another set of vessels to remove any excrementitious portion of that fluid which would be likely to interfere with the maintenance of a healthy action in the part. The lens of the embryon is just in proportion to the size of the eye-ball; therefore, with the natural developement of the adjacent tissues, does the crystalline lens thrive. This groath of the lens is then carried on by its proper secerning vessels, and its necessary transparency, quality, or consistency, brought about as I conceive, through the powers of the absorbents of that body.

Many physiologists of the present period, are firmly of the opinion, that veins possess absorbent power, but this power of the veins I very much doubt, believing they perform an office peculiar to themselves, that of solely conveying the sanguinous fluid unfit for the nourishment of the body to the heart, to be propelled through the oxygenating aparatus, preparing it for the necessary uses of the animal æconomy.

If from puncturing the eye-ball, an effusion of blood takes place in the anterior chamber, we shall have it removed perhaps in the space of twenty-four hours, force into this chamber a piece of metal, the size of a shot, will frequently disappear in a time not anticipated or expected by the patient or practitioner; by what process then is the removal of these foreign substances accomplished? Well known, first, by the solvent power of the aqueous humour; secondly, the removal of the saturated humour, by the lymphatics. Not that foreign substances are sucked up by the absorbents and the humour left undisturbed. It is then we find the aqueous humour removed with the substance, and a secretion of new humour takes place. If the aqueous humour is discharged by an incision in the cornea, we will have it reproduced, commonly in twenty-hours, if there is not present much constitutional ennui. Indeed, it is truely wonderful to view the beautiful mechanism of the eye, and comtemplate its uses.

If there were no absorption of the saturated aqueous humour, its pelluced quality would be destroyed, consequently vision impaired or completely abolished. Lymphatics, I conceive, accompany the nerves and serous vessels to the crystalline body, which vessels, after having ramified upon its capsule enter its substance for the vitality and proper developement of this body from the fœtal state to manhood. These lymphatics and secerning vessels no doubt, differ somewhat in their consistency from other secerning and absorbent vessels but not in their function.

These vessels are again, of such extreme delicacy, that they correspond to the transparency of the crystalline lens, so as not in the least when in a state of healthy action to interfere with the passage of the rays; to impinge upon the immediate organ of vision. I can scarcely for a moment conceive it possible, that these secerning vessels can carry the red blood, for should they be so proned to such a sufficiency of relaxation, as to admit the red globules, we should have in nine cases out of ten of choroiditis sclerotitis or iritis, the inflammatory action conveyed to the vessels of the chrystalline body, whereas, in the majority of the ophthalmiæ, and indeed, in those of the most vehement and intractible species which have terminated in a collection of pus in the anterior chamber, or with obliteration of the pupil, without producing the least perceptible change in the lens. Furthermore, did the opacity of the crystalline lens exist as a disease consequent upon inflammation of its capsule, there would certainly be some peculiar pain or tingling sensation in the eye-ball at the time the disorganization is going on, or some traces found in the substance of the lens, or on its capsule after extraction.

I cannot acquiese in opinion with some gentlemen, that inflammation can revel in the substance of the lens or its capsule, without producing any of the phenomena so characteristic of inflammation in other parts of the body, I have always found present in inflammation some peculiar signs or feelings evinced by the patient, such as either heat or pain, indicative of the inflammatory action.

We hear of cataracts having been completely formed within a few hours. The following is from Professor Jameson's Recorder of October, 1831, page 538, a case which came under the care of a Dr. Wendelstorm. "The case of a robust peasant, aged sixty, who enjoyed excellent health, suffering only occasionally from slight attacks of gout, eye sight very good, who while felling wood, experienced a dimness of sight which gradually increased, and within a few hours terminated in total blindness. He had not the slightest pain or external inflammation. He was seen by Dr. W. a few days after this occurrence, at which time both lenses were opaque, and were extracted. Might not this opacity of the lens have been brought about by a translation of gouty irriration, through the medium of the nervous system, to the lymphatics, producing in them functional or organic derangement? does it seem a rational conclusion to say here, that the sanguinous portion of the blood could have entered the secerning vessels, and that all the phenomena so characteristic in this case, was brought about in such a short time? However, as the theme in question does not have much bearing in the treatment of cataract, we will finish the subject by remarking, that if Professor Walther's opinions and observations be true, that cataract "is the primative and natural state of the lens, and that congenital cataract is therefore not an altered, but an unaltered condition, in consequence of a check given to the developement of the embryo." I should say, this expression gives us more grounds for believing the existence of lymphatics, were not some operation carried on in the lens before birth, so as to fit it for the passage of the rays of light, consequently children would come into the world blind. I am therefore firmly of the opinion, that cataract is a disease depending upon functional or organic derangement of the lymphatics of the lens, in consequence of which disturbance in their functional office, the secretion from the secerning vessels, no doubt, becomes increased in ratio to the powers of the lymphatics.

The increase of secretion may take place either in the capsule or in the substance of the lens, the disorganization is sometimes discovered situated at the edge of the lens, or it will be seen by a small speck, of a leaden or pearl colour, in the centre of the lens; but to say that we can ascertain with precision whether this morbid action is going on in the substance of the lens or its capsule, I believe to be a matter of impossibility.

Scarpa says, "The most experienced oculist of the present day, is not able to determine with precision, what the nature and consistence of the cataract is, upon which he proposes to operate, nor whether the capsule be yet transparent or not, although the lens be evidently opaque. For it is an indisputable fact, that the capsule sometimes preserves its transparency when the lens does not. The want of accurate notions, however, upon the subject does not materially influence the success of the operation, as the surgeon ought in every case to be prepared to employ such means as the particular species of cataract which presents itself to him, may require during the performance of the operation, whether hard or soft, accompanied by opacity of the capsule which invests it or not. The firm crystalline cataract undoubtedly admits of being more easily removed by the needle from the axis of vision, than any other, and does not rise again to its former place, if the surgeon in removing it from the pupil, uses the precaution of burying it in the vitreous humour. The soft, the milky, or the membraneous cataract, however, when met with in the operation may be also removed from the pupil, effused or lacerated with the same needle, without the necessity of introducing any other instrument in the eye."

Blows inflicted in the vicinity of the eye or immediately over that organ, the effect of the blow is concentrated to the lymphatics of the crystalline body, producing in them either a functional or organic derangement. The translation of morbid matter, the irritation from a carcinomatous tumour, deseased abdominal or thoracic viscera, act in like manner to external injuries.

"The lens may become opaque in consequence of a blow upon the eye, without being dislocated from the capsule; of this Mr. Lawrence states he has seen many instances, but he does not attempt any explanation." Mr. Stratford believes in cases that the force applied ruptures the nutritious vessels of the lens, which cause consequently an effusion.

Pott, Hay, and a host of other scientific gentlemen, advise not to operate too hastily in all cases of cataract, especially those consequent upon blows, for they sometimes disappear without the interference of the knife or needle. I have no doubt, in some cases of cataract, where the functional powers of the lymphatics are not abolished, an absorption of the effused matter may take splace, but this I believe very rarely happens.

Diagnosis. Professor Beer says, first, "in cataract, all objects, especially white ones, appear involved in a thin cloud or mist; second, the division diminishes in proportion to the visible cloudiness behind the pupil; third, the cloudiness shews itself most distinctly towards the centre, seldom at the border of the pupil; fourth, as the cataract increases, a blackish ring is observable at the border of the pupil, especially in light coloured eyes; fifth, at first, cataract obstructs the vision of objects directly opposite to the eye, but when viewed sideways and in a moderate light they are discerned with tolerable clearness; sixth, dioptric glasses aid the vision of cataract patients, so long as the cloudiness behind the pupil is inconsiderable; the flame of a candle appears to an eye in which cataract is forming, to be surrounded by a whitish circle or vapour, which appears broader the farther the patient removes from the light; if the cataract be completely formed, the patient can no longer see the flame, and can merely say where it is; lastly, incipient cataract does not influence the mobility of the iris, if, at last, its movements are impaired, the complaint is by that time sufficiently obvious. On the other hand, the appearances, which characterize the formation of amaurosis, are the great depth at which the cloudiness appears behind the pupil on looking at the eye sideways, from the cloudiness appearing somewhat concave, from its colour being more of a greenish or redish hue; the diminution of vision bears no proportion to any perceptible cloudiness; the pupil is more or less expanded, the iris little or not at all moveable; the pupillary border angular, and the pupil not perfectly circular; the cornea loses its natural and healthy aspect. In incipient amaurosis, there is also a remarkable increase or diminution of vision, not affected, as in cataract, by the degree of light or expansion of the pupil, but depending on physical and moral causes, affecting the sensibility of the individual; violent emotions of mind often giving a temporary increase of vision, while it is evidently diminished by long fasting, restless nights, great anguish, sudden fright, or excessive venery; under the operation of such causes, incipient amourosis often terminates in permanent blindness. To the amaurotic patient, the flame of a candle appears as if involved in a mist, but, unlike the white cloud already described, exhibits as well as the flame itself, the colours of a rainbow; glasses are of no use to the amaurotic patient, and he distinguishes objects at the side with as much difficulty as those directly opposite to the eye."

Wenzel states, "that he has occasionally discovered black cataracts wherein there were scarcely any unnatural colour to be seen in the pupil; De Hæn and Van Sweeten, have been mistaken. Mr. Ware decides peremptorily, that "it is a rule as certain as almost any in surgery, that when an eye in a state of blindness, is accompanied with a clear black pupil, which is incapable of varying its size according to the degree of light to which the eye is exposed, this blindness is produced by a defect of sensibility in the immediate organ of vision, and removeable only by the application of proper stimuli to rouse it again to its natural action."

OF THE OPERATIONS FOR CATARCT.

Many methods have been devised for the removal of the opaque len from the axis of vision, and as many have strenuous advocates. Before describing the different operations, it is indispensably necessary to pass a few remarks with respect to the constitution of the patient. An individual who is to be operated upon for cataract, we are strictly advised that he for the first twenty-four hours abstain from all such substances as are likely to require a long digestion, or that will overload his stomach, the body to be acted upon by some laxative medicine; in fact, it would be well to deplete in strong athletic subjects with the view of moderating the inflammatory action, which inevitably succeeds the operation. If the patient has a timid or irritable constitution, give thirty or forty drops of the Ticture of Opium in a little wine; an individual, besides the cataract, may have a chronic or acute conjunctivitis with swollen and jummy tarsi. This morbid condition of the conjunctiva must be removed first, by the antiphlogistic regimen in conjunction with proper collyriums. To overcome the affection of the tarsus, the following ointment is recommended. Ung. hyd. nit. 2 oz. Adepis suillæ 4 oz. Olei oleviæ 1 oz. A small proportion to be rubbed in between the tarsus two or three times a day. Should the above not remove the disease, one recommended by Janin may be substituted, prepared as follows: Take ½ oz. of hog's lard, 2 dr. of prepared Tutty, 2 dr. of Amenian bole, and 1 dr. of the white precipitate of mercury. It would be better to adulterate this ointment with thrice its quantity of unsalted butter before using it, and in the course of the day a collyrium composed of the following ingredients: 2 oz. of Rose water, 1 dr. of the mucilag of Quince seeds and, 5 grs. of the Sulphate of Zinc, with 10 drops of laudanum proves effectual. Previous to applying these remedies, a speedier cure could be accomplished by immediately detracting blood from the temples by means of cups, removing all constipation of the bowels attending to the different secretions. In fine, no operation should be attempted if there is manifest the least uneasiness of the cerebrum, breast, or eruption on the skin, any of the constitutional complaints in action, such as scrofula, scurvey, gout or phythisis. Though on the other hand, the system should not be too much below its natural healthy action, for the solvent powers of the aqueous humour, and the healing process of the cornea, if extraction is attempted, would be perhaps, much impaired. However, an operation should not be refused only upon suspicion that some taint lurks in his constitution, without more obvious characteristic features of the disease. For instance, a man who is suspected labouring under a scrofulous diathesis from some hereditary taint, but still there are no symptoms of the disease present indicative of the taint, I conceive the practitioner perfectly justified in removing the lens.

Scarpa observes, "It is easy to determine whether an operation can be performed with a prospect of success or not. A favourable issue may be expected whenever the cataract is simple, or without any disease of the eye-ball, in a subject not quite unhealthy or decriped, and in whom the opacity of the crystalline lens has been gradually formed without having originated from any external violence, or habitual ophthalmia, especially the internal; whether there has not been frequent pain in the head, eye ball and supercilium, where the pupil, notwithstanding cataract, has preserved its free and quick motion, as well as its circular figure in different degrees of light; and lastly, where, notwithstanding the opacity of the crystalline lens, the patient retains the power, not only of distinguishing light from darkness, but also of perceiving vivid colours, and the principle outlines of bodies which are presented to him, and when the pupil has that degree of dilatation which it is usually found to have in a moderate light."

In consequence of a ragged dilated and motionless condition of the iris, seen in some cases of cataract, with a total abolition of vision, patients have been refused an operation, upon the grounds that the sensibility of the retina is abolished.

Baron Larry says, that "until of late, it has been generally acknowledged, that the contractile and retractile property of the iris arises from the nervous influence of the optic nerve, or retina. The greater number of the partizans of this opinion also advise not to perform the operation for cataract, especially extraction; when the iris is deprived of motion; because they suppose in this case that the visual organ is also paralysed. But since it has been found by experience that, in certain cases, the visual functions are restored after the depression or extraction of the cataract, though the iris was before immoveable, it has been supposed that this membraneous partition could only contract when the retina received that impression which it requires in order that this contraction may take place. I shall endeavour first to demonstrate the error of this assertion, and afterwards to shew, as clearly as I can, that the contractile property of the iris is independent of the nervous influence of the retina or optic nerve."

"I am now convinced, by my researches, and the cases that I have collected, that the properties of the iris depend especially upon its peculiar tissue, and ciliary nerves, furnished principally by the lenticular ganglion belonging to the great sympathetic. This arrangement shews the nature of the paralytic affection of this membrane, when it exists, and the reasons why it does not take place when the optic nerve is paralyzed, or altered by any disease whatever. Thus, I have seen patients attacked with *gutta serena*, while the iris preserved its motions. The little English boy, whose sight I had the good fortune to restore in Spain, after the campaign of Corunna, was an example of this. This case of *gutta serena* is inserted in the third volume of my Campaigns, page 239, and is cited in the preceding Essay on Moxa."

"In fully formed cataract, the retina may preserve its integrity, so as to be ready to resume its functions, when it shall be placed in a situation to receive the image of objects by the extraction or depression of the opaque veil which intercepts the passage of the luminous rays, though the iris be paralysed; because this last affection depends upon the lesion of a system of nerves which belong to internal life, and which have with the life of relation but indirect communications, by means of small nervous anastomoses. I would wish, however, not to be understood to include adhesions contracted by the iris, which may be confounded with paralysis of this membranous partition. I have witnessed many facts which go to support this opinion, and which prove that the immobility of the iris does not contra-indicate the operation of cataract."

I am persuaded from the above remarks and what I have seen, that the motions of the iris are not at all times governed by the retina, and that this appearance which the iris assumes in some cases, may moreover be owing to the pressure of the opaque lens against the uvea, so as to prevent the circular fibres, (or those fibres which are supposed to contract the pupil,) from exerting any action upon the iris. However, as little injury can be done to the eye by a proper introduction of the needle or knife, I should say, were the case of twenty years standing, and the iris presented all the above aspect, remove the opaque lens from the axis of vision; should a paralysis of the retina be conjoined with this condition of the iris, in all probability the rays of light (its proper stimule) inpinging upon it may cause it to resume its functions, if not completely, peradventure in a partial degree. I say, that man who is possessed of the common powers of ratiocination, should not be led by mens' opinions antecedent, or any set of cotemporary partizans.

Let him test the effects of an operation upon the diseased part. Alas, provided as Deacon Pipkin of Linconshire, in his exhortations, used to say, "*that if his humane professional fellow creature should not take a failure into consideration, and commence battering his character like a ram butting its enemy,*" we have heard said, "*this venerable man of such diabolical acts been committed, heaven lend them a better and a larger soul, quoth Pipkin, that they may turn from iniquity*" The deacon would often remark, "*that man who is disposed to calumny, it would take ten thousand of such souls as his to fill the stomach of a knat, and still be room left.*" Once, quoth the deacon, "Irata vipera hæsit in bonum semen Æsculapii," (the deacon never knew more latin than the above quotation, and would always use it when a proper opportunity offered) and eyes sparkling with fire, turning his spectacles upon his forehead, addressing a visionary object, would thus exclaim: "*Thou foul monster calumny, thou art leprous and crusty nature, through every vessel glides venom the most pernicious; better fit to be lodged in the trunk of the Upas, than course through a system of vessels, which so much resembled the human race.*" Jonathan Doolittle, who always paid the most implicit attention to the deacon's discourse, at this moment removing a large plug of the weed from the right to the left jaw, which caused him no little difficulty, shaking his head, would tacitly concur in opinion. It must not be surmised here for a moment, that the deacon meant sure enough a snake, it was only by way of comparison. Deacon Pipkin had too noble a heart, and big soul, too much of a philanthropist, to wound the feelings of any creature by direct inuendoes. It might be thought something very strange here, that Deacon Pipkin should break off in the height of his exhortation, and speak of the sons of Esculapius. It was for this plain reason my reader, the deacon espied just on his threshold, a man of that character, and he now thought it a favourable opportunity to give him a touch, hoping at the same time it would not prove offensive to his hearers.

OF THE OPERATIONS ANTERIOR TO THE IRIS.

"A great variety of operations have been recommended," says Mr. Stratford "for the cure of cataract, at different times, an admirable account of which may be found in Mr. Guthrie's "operative system;" many of these, when employed in appropriate cases, will be found to have their attendant advantages and disadvantages; but as a general rule we should have it firmly impressed upon our minds, that in every instance, the operation must be adopted to the kind and variety of cataract, rather than the eye to the operation, which was frequently the case when they made use of but one kind of operation in every instance." I cannot conceive what great benefit is to be obtained by the selection of a peculiar method of operating for certain cataracts. It seems obvious to me, that either the operation of extraction or that performed posterior to the iris for division and laceration of the lens, will suffice in the generality of cases to accomplish the wishes of the patient and operator. I think it unnecessary upon the whole, to insist upon certain operations for the removal of particular cataracts.

Our author further says, "For the cure of that variety of cataract, the consequence of acute inflammatory action, when the lens and the capsule are equally affected, the division or breaking up of the cataract will generally be found the best and most speedily successful; but even this should be adopted but under necessary limitations, for if the lens is very large, and encroaches much upon the posterior chamber of the aqueous humour, it will be apt, if employed in the first instance, to create considerable, and perhaps destructive inflammatory action. When, then, the lens is of the natural size, and the eye otherwise healthy." (I conceive the lens somewhat larger in a morbid than a healthy condition, the secretion, or effusion of lymph or serum, that destroys the transparency of the lens, no doubt distend the capsule beyond its natural limits.) We may, after having fully dilated the pupil with the belladonna, proceed to the operation. Our author recommends nearly the same preliminary steps, and the needle as was used by Saunders.

Says our author, "Mr. Guthrie, in the last edition of his work on the operative surgery of the eye, has described a knew knife, which he has invented for the section of the cornea in this operation, and which he considers, will remove every difficulty and danger which is likely to occur in its performance. He appears originally to have taken the idea from Dr. F. Jager, of Vienna. It is a double knife, one part being a cataract knife, of the shape of Wenzel's, the other a silver plate of the same form but larger and blunt. The steel knife is sharp; it is attached to the silver one by a button screw on the handle, which permits the knife being pressed forwards, while it is closely and nicely fitted to the silver blade, so as to form but one instrument. When we intend to use it, Mr. Guthrie recommends us to make an opening in the cornea with one of Wenzel's large knives, and of such a size as to admit the instrument; as soon as the opening is made, this knife is to be withdrawn; the aqueous humour now flows out, the iris is pressed forwards against the cornea; perhaps a portion of it will protrude through the opening, when by rubbing the lids with a silk handkerchief, or the finger, it may return again. The eye-lids should now be gently raised, and the new instrument is to be introduced through the wound, the silver blade being next the iris. The silver point being larger than the steel one, we easily raise the cornea, and press back the iris, when *by alternately* raising and depressing the point of the instrument, it is easily carried across the anterior chamber, until it touches the inside of the cornea, either immediately opposite the point of entrance, or as much above or below as we may think fit. The thumb, which has hitherto been rested on or near the bottom of the screw, is now made to press it forwards, and to protrude in consequence the sharp steel blade through the layers of the cornea. Now we shall find that the instrument will cut its way out, and the operation is to be finished in a manner similar to that previously recommended."

OPERATION OF INCLINATION.

"The operation of reclination through the cornea (observes Mr. Gurthrie,)' has been principally introduced and supported by Professor Langenbeck, of Gottinger, and is to be performed in the following manner. The pupil having been previously dilated to its utmost extent by the application of the belladonna, (which may be either applied in the form of the extract to the temples, or rubbed upon the lids eight or ten hours before the operation,) the patient is to be seated, and the eye-lids secured in the usual way; the small curved needle, of which a drawing is given, held in the manner of a writing pen, is now to be introduced at the lower part of the cornea, the concave part being upwards, the convex downwards, and pushed quickly but steadily, through the anterior chamber, until it touches the lens. This part of the operation will be assisted, and the point of the instrument more readily and certainly introduced at the precise spot intended, if the operator fixes the eye with the fore finger of the left hand, immediately below this part, so as to be able to allow the needle to pass along, and to be supported by the nail in its passage through, and into the cornea. The convex part of the needle, which is turned towards the cataract, is now to be passed upwards and placed against its upper edge and face, when the needle is to be raised so as to cause the point to pass backwards and downwards, carrying with it the cataract, which is in this manner reclined; the lower edge being forwards, the upper backwards, the anterior surface upwards, the posterior backwards. If the opaque lens should not be out of sight, it is to be depressed by lowering the point of the instrument, which should be kept steadily upon it for the space of a minute, and then gently raised, when, if the lens should not follow, it is to be withdrawn, and the eye closed when the operation is completed. If the lens should rise and follow the needle into the axis of vision, the same proceeding for its depression must be repeated, under the same circumstances as in reclination or depression behind the cornea; but if it be observed, that in consequence of the softness of the lens, the point of the instrument has sunk into it, a rotary motion must be given to it between the finger and thumb to extricate previously to depressing the handle of the instrument, in order to withdraw it which must be repeated until it is effected, and the lens remains reclined, although it will not always be depressed so deeply as not to be visible when the pupil is dilated." This method of operating does not seem to have met the approbation of the generality of surgeons, I have no doubt but it will prove as effectual as Scarpa's way of operating. The after treatment is the same as the one posterior to the iris; the needle is withdrawn, allowing the lid to drop, covering the eye with a compress of folded linen, the patient confined to a dark room for seven or eight days; the light should be admitted into the room gradually, and if much inflammation supervenes, the patient must be treated with the antiphlogistic regimen; sometimes the puncture made in the cornea is slow in healing, and fungous sprouts from it, will disappear by touching it once or twice with lunar caustic; hæmorrhage may take place in the anterior chamber generally the result of wounding the ciliary arteries, it will in a short time be absorbed.

Wenzel says, "Those persons who have undergone the operation of couching, sometimes feel constant pain in the eye as long as they live;" these pains are probably occasioned by the injury which the retina sustains in consequence of its pressure between the choroid and the depressed crystalline. Daviel says, "in regard to his post mortem examinations, he has found the lens lodged between the retina and choroid, and these two membranes torn in several places; if symptoms of inflammation therefore succeed this operation, the lancet must be used freely, and alterative remedies resorted to; and if attended with much pain, an anodyne may be given, occasionally vin. opii, proves an excellent preparation for allaying the pain, given in twenty or thirty drops at a dose.

OPERATION OF EXTRACTION.

Mr. Traverse says, "the operation of extraction is by far the most perfect ever devised for the cure of cataract; but it is one of considerable difficulty, and the several modifications which have been at various times suggested, owe their origin to the disappointments and defeats which operators meet with in learning to execute it with success. The preference entertained for couching, rests on no better ground than its greater facility, and therefore less risk." No operation in surgery," he says, "requires an equal degree of temper and experience for its accurate and successful performance."

The Baron de Wenzel is reported to have said, "that he had spoiled a hat full eyes before he learned to extract." "There are some excellent directions in his treatise translated by the late Mr. Ware, upon this operation. It is objected to this operation, that it is one of which the result is a matter of hazard. It has been answered, not more in the hands of qualified persons, than hernia, lithotomy, anneurism, and other important operations. Secondly, if it fails, it fails beyond recovery. This, I contend, is rarely the case in the hands of competent surgeons."

Further, observes our author, "It is a point of considerable importance, that the section should be purely corneal. I mean, that it should not be carried so low as to verge upon the sclerotic, and thus to leave the corneal margin of an insufficient breadth for union. Two ill consequences arise from this; first, the iris unsupported at its base, commonly falls and prolapsus at the wound, even though the section be ample in extent, and the escape of the lens perfectly easy; and secondly from the defect or narrowness of the corneal margin, and the non-apposition of homogenious parts, the healing is always remarkably slow, even though no prolapsus should take place. An oozing of humour is continually occurring, and I have sometimes seen a portion of the capsule, now turn opaque, protrude, and consequently slough at the section. When a prolapsus of what ever kind, prevents the healing of the wound, it should be completely snipped off with a pair of iris scissors, and the surface and edges of the wound touched with the caustic pencil. This practice I have repeatedly adopted with the best effect, in prolapsus from the wound, as well as from ulcer."*

Says Gurthrie, "The introduction of the operation for removing a cataract by extraction, is justly attributed to Daviel, a French surgeon, who seems to have practised it in a regular manner." The opening of the cornea for this purpose, was not a new discovery. Rhazes says, "That about the end of the first century, Antyllus opened the cornea, and drew the cataract out of the eye with a fine needle, in which practice he was followed by Lathyrion." Haly, the Arabian, also notices in his works, the operation by extraction and depression. Aricenna did not sanction this operation, in consequence of the humours of the eye escaping, when the cataract is hard, when by accident the cataract had passed through the pupil into the anterior chamber." It has been conjectured, that the division of the cornea for cataract is of very ancient date. Galen mentions, "that their was a tradition, that for the operation for the cure of cataract, man was indebted to what was observed to happen to the goat, which after pricking his eye against a sharp reed, retained the power of sight, whence it has been thought that the first operation practised for the cure of cataract, may have been a division or punctuation of the lens through the cornea."

St. Yves recommended the following operation. The patient is seated upon a chair, with the eye fairly exposed to the light; the lids are to be kept open with the thumb and fore-finger of the right hand, the cornea is to be opened with a fine cutting lancet commencing a little below the level of the pupil, and continuing it across to the opposite side, so as to leave only half a line on each side of the lower half of the cornea undivided. Through this opening a fine curette is to be introduced; and by passing it behind the crystalline, its extraction is to be accomplished. The eye is to be dressed and attended to in the usual manner. Daviel acknowledges this operation as "the parent of extraction." Gurthrie observes, "that Mr. Mery and he were at an operation performed by the celebrated M. Petit, on a priest, whose crystalline, which had been depressed some years before, passed, in consequence of sudden exertion, through the pupil and lodged between the iris and cornea. M. Petit having first pierced the cornea with a small needle, cut it open with a lancet, and withdrew what he discovered to be the crystalline. This patient was soon well, and could read perfectly with a cataract glass." Planter and Chandler say, "if the lens is found between the iris and cornea, the latter must be opened in its lower half."

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*See his Synopsis on the diseases of the Eye.

Gurthrie further says, "The left eye should be operated upon with the right hand, and if the operator be ambidexter, the right eye with the left hand, or the position must be changed. For the left eye, the patient should be seated on a low stool or seat, the back of which, if a chair, should not be so high as to prevent the assistant's readily moving the head in every direction. He should be placed immediately before a light that is not very bright, that the pupil may not be too much under its influence. It should fall directly upon the eye, and not be allowed to enter from any other part, so that there may be as little reflected light as possible, to interrupt distinct observation during the several stages of the operation. The surgeon should be seated on a stool, and raised so much higher than the patient, that his breast becomes parallel with the patients head, which allows him the free use of his arms, without raising them above their usual line of action, or inducing fatigue, and enables him at the same time to observe every part of the operation from above, downwards. The legs of the operator are to be placed on each side of the patient, and the right foot raised by a stool to such a height as will enable the surgeon to rest his elbow on his knee, whilst his knife is on a level with the eye, and in this manner, if he requires, give him support during the first steps of the operation. The assistant, who should be duly instructed in his duty, now presses the patient's head gently against his breast, where he fixes it firmly, but tenderly, by placing his right hand under the chin, if it be the left eye that is to be operated upon, having previously covered the other eye with a bandage. He then lays his left hand flat on the forehead, so that the points of the fore and middle fingers pass beyond the edge of the upper eye-lid. The lid is to be raised with the point of the forefinger, and fixed with the assistance of the other, by pressing the tarsus against the upper edge of the orbit; but neither should press on or disturb the ball of the eye, unless where the assistant is *perfectly* acquainted with the business. The surgeon draws down the lower lid with the fore-finger of the left hand, which gently touches the conjunctiva, whilst the point of the middle finger placed over the caruncula lachrymalis, in the same manner, prevents in a great measure the eye from rolling inwards, and this gentle pressure may be continued until the knife has pierced the cornea on both sides, or the punctuation, as this is termed, has been completed, when it must be removed as unnecessary and injurious. (No great pressure can be admitted with safety; and the spicula of Beranger, Guerin, Pope, Petit, Le-Cat, Boyer, Peller, Pamard, Rumpelt, as well as those of more modern invention, are all abandoned as worse than useless.) Taking the knife in the right hand in the same manner as he would hold a pen, he supports his hand as in writing, by separating the little finger from the others, and resting it upon the orbit. The operator now waits patiently until the eye ceases to roll, or he touches the cornea gently with the flat surface of the knife, until the eye appears perfectly quiet, when the point is to be entered nearly one line from the union of the cornea and sclerotica, and rather above the horizontal diameter." (There seems to be no little diversity of opinion among occulists, with respect to puncturing the cornea. Wenzel directs the puncture to be made a quarter of a line from the union of the cornea with sclerotica; Ware, something more than half a line; Wardrop, one line, and Beer, at the distance of one eighth part of a line.) "The point of the knife having penetrated the cornea in a direction tending to the perpendicular, the handle is to be slightly depressed towards the temple, by an almost imperceptible motion of the fingers, and pushed forwards steadily, neither too slowly nor too quickly across the anterior chamber, with the posterior side of the blade near to and parallel to the iris, neither turning the edge inwards or outwards, until the point shall fairly have passed out through the cornea, exactly opposite where it entered, at the same distance from the sclerotica, and without the slightest pressure having been made upon it downwards. The punctuation of the cornea, as it is called, is now completed and pressure on the eye, either by the fingers of the operator or assistant, must be removed. (Beer divides the operation into three stages: first, the incision of the cornea: second, the opening or destruction of the capsule: third, the removal of the lens. The first stage he divides into four parts: first, the entering of the knife: second, passing it across to the anterior chamber to the point of exit: third, its exit: fourth the completion of the incision.)

Further remarks our author, "The patient, having a little recovered, the surgeon, in all ordinary cases, now takes en tirely upon himself the charge of the eye, and gently raises the upper lid with the middle finger of the right hand, and introduce the hook or lance; pointed needle for the division of the capsule. In doing this, he should see the pupil distinctly: the point of the instrument should be passed under the flap, directed towards the interior angle, and carried upwards towards the centre of the capsule, the edge turned towards it, and several slight tears or cuts made in it in different directions, so that it may be cut in pieces, when the hook is to be withdrawn as introduced. During this part of the operation, a bright light should not be allowed to fall upon the eye, or the pupil will contract. If the light has been well regulated, and the capsule properly torn or cut, the lens will frequently follow the needle out of the eye, when a few moments rest will be allowed. If it does not appear to begin to do so, the operator must endeavour to ascertain the cause, and especially to discover if it is dependent an any fault in the operation. If the incision in the cornea is not large enough, it must be increased with Daviel's scissors, or with a small knife, rounded at the point for the purpose. If the capsule has not been sufficiently divided, it must be now done; but if these important points has been duly completed, the operator will then assist in the expulsion of the lens; first, by giving or allowing motion to the eye-ball, by a gentle pressure made on it; and, lastly, by increasing with the point of the finger. In the first instance, he directs the patient to move the eye a little quickly upwards, by which the lens is frequently observed to move from its natural situation forwards, and at last, by the gentle pressure of the lid and muscles, to be protruded. If this should not succeed, the point of the fore-finger should be pressed gently on the lower part of the ball, and the pressure increased until the inferior edge of the lens is seen to rise, when it is to be continued in a gentle steady manner, until the cataract is expelled. The evacuation of the lens at this period may be assisted by the scoop, and the falling off the lid ought to be simultaneous with its expulsion. In some rather rare cases, the lens, although opaque, is greatly diminished in thickness, so as not to excel half its natural size." (Not wishing to doubt here the veracity, of our author's assertion, nevertheless, I conceive this lessened size of the opaque lens, to be of uncommon occurrence. In fact, from some redundancy of the aqueous, with a diminution of the vitreous humour, the opaque body may be so far lodged in that humour; consequently its distance from the pupil being greater than ordinarily may deceive the practitioner in his calculations.) "A circumstance which may be suspected previously to the operation by the unusual distance at which the opaque body seems to be situated from the iris, and in two cases which come under my care, the black vitreous humour appeared under the edge of the opaque lens, which seemed then to fall downwards, as if verging to the bottom of the eye. The slightest degree of pressure, in this stage of the operation, does harm, as it causes the rupture of the hyaloid membrane, and the evacuation of the vitreous humour, whilst it rather impedes than assists the discharge of the lens. The operator must here act in a direct and decided manner, by introducing the large hook usually attached to the end of the handle of the curette, underneath and behind the lens, which is to be in this way hooked by it, and brought out of the eye. This is necessarily attended with the loss of a part of the vitreous humour, but which is often found to be of little importance. The operation being finished, and the lid having fallen, it is on no account to be raised for the purpose of ascertaining that the patient can see, but simply to enable the operator to observe whether the pupil is regular, and if the edges of the incision are in contact, which is best effected by making the patient turn his eye upwards. The loss of the considerable quantity of vitreous humour, is never the immediate cause of blindness, it is the inflammation which ensues, that is the destruction of vision, and this occurs principally from a portion of the vitreous humour sticking about the edges of the incision, preventing the adhesive inflammation and consequent union of the cornea causing the supurative, which extends itself to the internal parts of the eye from the iris, which is coevally affected."

Observes our author, "whenever, then, an evacuation or protrusion of the vitreous humour, has occurred or seems likely to take place, the patient ought to be laid on his back, on the mattrass on which he is to remain; and before the upper lid is finally closed, if it has occurred, the iris should be restored to its natural position by the help of a small probe, if it will not return to it by gentle friction, so that the pupil may assume nearly its natural form. The edges of the incision are to cleaned with the same instrument, so that as little as possible of the vitreous humour may be allowed to remain between them; and although the eye may be exposed to more light than is desirable, it may, in part, be useful, by causing a greater contraction of the pupil, provided it does not call the muscles into action. If one fourth of the vitreous humour be lost, the sight will scarcely be impaired. The collapse of the eye is often, indeed, generally fatal to the eye. The subsequent antiphlogistic treatment ought to be infinitely more severe, and the attention and confinement considerably greater. If the flap of the cornea be properly adjusted, the union will be complete, and with little additional matter or opacity, the whole assuming nearly its natural convexity. The vinum opii, the argentum nitratum, the tinct. Ferri. muriatis, will be found the best applications, with the Ung. Hydr. Nitr. properly diluted to subdue the chronic state of irritation likely to ensue on the lower lid."

Baron Wenzel performed the operation in the following manner: "The patient is seated in a low chair before a moderate light, which strikes the eye obliquely. The sound eye being covered with a compress retained by a bandage, an assistant placed behind, must hold the patient's head, and support it on his breast. With the fore-finger of the hand that is at liberty, he is then to raise the upper lid of the eye to be operated upon, and gently to press the tarsus, with the extremity of the finger, against the upper edge of the orbit. In order to assist this arrangement, and properly to fix the lid, the assistant should take care to draw up the skin over the orbit, and strongly to fold the teguments that support the eye-brow. By this method the eye will be entirely uncovered, an undue pressure upon it will be avoided, the fingers of the assistant will not interfere with those of the operator, and the eye-lid will be so fixed as to be incapable of any motion."

"The operator is to be seated on a chair a little higher than that of the patient. The eye naturally turning towards the light, he is to place the head of the patient obliquely to a window, so that the eye to be operated upon may be inclined towards the outer angle of the orbit. This position of the eye will enable the operator to bring out the knife, on the inner side of the cornea, opposite to the part where it pierces this tunic more exactly than he would otherwise be able to do."

"The operator is to rest his right foot on a stool placed near the patient, that his knee may be raised high enough to support the right elbow, and to bring the hand with which he holds the knife, to a level with the eye on which he is to operate. He is to take the cornea knife in his right hand, if it be the left eye on which he is to operate, and, *vice versa*, the left hand, if it be the right eye. The knife is to be held like a writing pen, and his hand is to rest steadily on the outer side of the eye, with the little finger separated a little from the rest, on the edge of the orbit. In this position he is to wait, without any hurry to begin the incision, until the eye which is usually very much agitated by the preparations for the operation, becomes perfectly still. This always takes place within a few seconds of the time, and therefore, as I have already fully expressed myself on the subject, every instrument invented to fix it is useless."

"When the eye is still and so turned towards the outer angle of the orbit, that the inner and inferior part of the cornea, through which the point of the instrument is to come out, may be distinctly seen, the operator is to plunge the knife into the upper and outer part of the tunic, a quarter of a line distant, from the sclerotica in such direction, that it may pass obliquely from above downwards, parallel to the plane of the iris. At the same time, the operator must depress the lower lid with his fore and middle fingers, which are to be kept a little distant one from the other, and must take the greatest care to avoid all pressure on the globe, which is to be left perfectly free, as the surest way to diminish its power of moving." (Mr. Ware disapproves of this procedure, and recommends the globe at this time to be slightly pressed, which serves to fix it and prevents its motion.)

"When the point of the knife has proceeded so far as to be opposite to the pupil, it is to be dipped into this aperture, by a slight motion of the hand forward, in order to puncture the capsule of the crystalline; (Wenzel's practice of introducing the knife through the pupil and puncturing the capsule, should be undertaken only by experienced oculists,) "and then by another slight motion, contrary to the former, it must be withdrawn from the pupil, and passing through the anterior chamber, must be brought out near the inferior part of the cornea, a little inclined to the inner angle, and at the same distance from the sclerotica, as when it pierced the cornea above. If the knife has been well directed, and the fore and middle fingers of the hand opposite to that which holds the instrument, have been properly applied, the section of the cornea, thus completed, will be found sufficiently large; its shape will be semi-circular, and it will be quite near enough to the margin of the sclerotica."

Remarks a late author, "While the section of the cornea is proceeding, and when the point of the knife has passed out at the side opposite to the part at which it entered, the assistant lets the upper eye-lid drop, and all pressure is immediately taken off."

"The next part of the operation consists in puncturing the capsule of the crystalline lens, for I believe few surgeons, (says our author,) have dexterity and confidence enough to do it with the cornea knife. The best mode of effecting this, will be to introduce the needle. (The needle used in the operation of reclination will answer.) Through the wound in the cornea, into the pupil, and move gently, but freely and quickly in all directions; by this manœvre the anterior portion of the capsule will be lacerated, and a gentle degree of pressure being made upon the eye, the pupil is observed gradually to enlarge, and one edge of the lens is observed escaping through it; all pressure to be immediately removed, and the opaque crystalline escapes."

Baron de Wenzel says, if in passing the knife through the cornea, the iris should fall before it, gently rubbing the cornea with the finger, will cause a retraction or contraction of that tunic. Mr. Ware believes this to be one of the most important directions given in the Baron's work. He performed the operation of extraction nearly in the same manner of Baron Wenzel; his knife differs a little in shape, "it being wider near the point, in order that the edge may quickly get below the inferior margin of the pupil, and thus avoid wounding the iris."

"Beer recommended in 1799, the following mode of extracting a cataract, of a medium consistency, being neither hard nor soft, by which lens and capsule may be removed at the same time; he says, to perform it well requires great care. He directs the lance-pointed needle to be thrust into the centre of the lens, the flat surface being up and down; the lens is to be moved suddenly through, slightly upwards and downwards, to detach it in that direction; the instrument is then to be turned so that the sides may be turned outwards and inwards, and the motions to be repeated to detach the cataract sideways. The needle being quickly withdrawn, frequently brings with it the lens and capsule, leaving the pupil quite black. If it should not come out, the more usual proceeding is to be adopted."

Our author says, when both eyes are affected with cataract, the operation can be performed upon the two at the same time.

Mr. Wardrop with the view of obviating those ill consequences which are likely to occur in Wenzel's opening the cornea, so near to the iris, which depriving that membrane of its necessary support, resulting consequently in a prolapsus of the iris, with deformity of the pupil, recommends the following method of incising the cornea.

"Having previously oiled the knife, to make it cut more keenly, its point is to be thrust through the cornea, a little above its tranverse diameter, and one line from its margin, in a direction as if it was to pass through the pupil, or nearly perpendicular to the spherical surface of the cornea. When it reaches the plane of the iris, the blade is to be moved a little upon the incision which is already made, as a fulcrum, so that the point is elevated and turned towards the opposite side of the cornea. It is then to be carried forward and a little obliquely downward, so that the cornea is again punctured at its transverse diameter, and at the same distance from the sclerotic coat at which it had been entered on the opposite side.* By these two incisions the blade has cut perpendicularly, or very nearly so, to the spherical surface of the cornea, and the gradual thickening of the knife, by filling up the wound as fast as it is made prevents the aqueous humour from escaping. The eye is now completely secured by the knife, and the incision is to be finished by turning round the blade on its axis, thus keeping the edge turned outwards in such a manner, that the remaining part of the incision is a straight line, and, therefore, nearly perpendicular to the lamellæ of the cornea. If none of the aqueous humour has escaped before the last step of the incision is begun, it is sometimes necessary to withdraw the knife a very little, to allow a drop of it to escape, before the knife can be turned on its axis." "The incision should be made so that the inferior edge of the wound is half way between the circumference of the cornea and edge of the pupil, supposing the pupil to be in a moderate state of dilitation. If it be made nearer to the sclerotic coat, then the advantage to be expected from this mode of operating will be lost; and, on the other hand, if it be made at too great a distance from the sclerotic coat, and consequently too near the pupil, the iris will be apt to fall forwards, and a portion of it pass through between the lips of the wound." "In making the incision of the cornea in this manner, another circumstance also particularly deserves notice, which is, that on giving the knife the motion round its axis, after having punctured both sides of the cornea, there is a great risk of the iris turning over its cutting edge, some of the aqueous humour having generally by this time escaped. An operator who meets with this for the first time is apt to think a wound of the iris inevitable; but if he cautiously stops the progress of the knife, and presses the iris from its edge, by sliding the point of his fore-finger over the cornea, the incision may be completed with perfect safety."

Gurthrie observes, "Wardrop recommends having the eye-ball properly fixed before attempting to introduce the knife, and supposes the five following advantages to accrue from his method of operating.

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*The punctuation is completed.

1. That large portion or ring of the cornea, is left attached to the sclerotic coat, and must form, from its thickness, a complete support to the iris.

2. That as the incision is throughout nearly perpendicular to the lamellæ of the cornea, the length of the incision of the internal layer will be greater than when it is made in the usual manner, and equal to that of the external one, consequently the lens will be more easily extracted through it.

3. The upper edge of the internal incision is also further below the edge of the pupil.

4. As the flaps are very small, the edges thick and not easily moveable, or apt to be caught by the motion of the eyelids, the lips of the wound are not liable to be displaced, and consequently the wound has a much better chance of uniting by the first intention.

5. The cicatrix which remains is scarcely perceptible, and cannot be distinguished when the cornea is looked upon in a direction perpendicular to the surface.

Of these advantages, (remarks our author) the fourth I consider as the only valid one, and it is counterbalanced by the diminished size of the opening; so that, upon the whole, although the operation may be and is successful in the hands of Mr. Wardrop, still, from what I have seen, I do not consider it generally as more easy of performance, or more successful in its results, than the one usually recommended."

Further says Guthrie, "The patient having a little recovered, the surgeon, in all ordinary cases, now takes entirely upon himself the charge of the eye, and gently raises the upper lid with the middle finger of the right, and introduces the hook or lance-pointed needle, for the division of the capsule. In doing this he should see the pupil distinctly; the point of the instrument should be passed under the flap, directed towards the interior angle, and carried upwards towards the centre of the capsule, the edge turned towards it, and several slight tears or cuts made into it in different directions, so that it may be cut in pieces, when the hook is to be withdrawn as introduced. During this part of the operation a bright light should not be allowed to fall on the eye, or the pupil will contract.

The introduction of the lance-pointed sharp instrument is owing to Beer. In most operations the capsule is extracted or completely destroyed, but in some it remains behind, either only torn or very partially destroyed on its anterior surface; which, if it be already opaque, or become so from subsequent inflammation, soon re-unites and forms a dense white substance, obscuring and tending to cause a contraction of the pupil. The patient sees but indistinctly; a secondary cataract, as it is termed, is formed, and requires another operation. To avoid this, we find many authors recommend an examination of the eye after the lens has been extracted, for the purpose of removing such membrane, if it exist, with the forceps, and by so doing they frequently cause a protrusion of the vitreous humour, and lay the foundation for subsequently high inflammation, irregularity of the pupil, and ulceration and opacity of the cornea, not to mention suppuration of the eye; and sometimes even failing in the removal of the capsule, after mischief has been excited. The best way of avoiding a capsular or secondary cataract, or the necessity for attempting its removal, is by taking care to divide the centre of it in the first instance, in the manner recommended. The pieces of capsule, cut or torn in this way, are either evacuated, ultimately absorbed, or shrink up out of the sphere of vision; but even if any should be observed hanging in the pupil, none, or but very careful attempts should be made to extract them, unless the greater part of the capsule remain in a thickened state, when it should be taken hold of with Gibson's spring forceps, and removed in a very gentle manner, by turning the instrument between the finger and thumb until its attachments are separated.

The division of the capsule and the removal of the lens are two important stages in the operation, and every precaution, however trifling, should be attended to. During the division of the cornea, a clear steady light has been allowed to fall on the eye, and although its rays have not passed on the retina, they cause a contraction of the pupil; and whilst the iris is thus in part prevented from falling forward, under or before the edge of the knife, it aids in supporting the lens in situ against the efforts frequently made by the muscles, compressing the eye-ball. The object now to be attained is exactly the reverse; it is a dilatation of the pupil, not its contraction, an effect hardly to be attained whilst the iris continues under the same influence, unless it be opposed by a counteracting power, that of pressure, which is highly mischievous. In a contracted state of the pupil, the capsule is but slightly exposed, and a very small part only is torn or cut by the instrument employed for this purpose; which is also more liable, however delicately or dexterously it may be used, to bruise and injure the edge of the iris, proving an additional exciting cause of inflammation. Therefore, when the surgeon raises the lid, he should take care to see the pupil distinctly before he introduces the instrument for dividing the capsule; and if the pupil be not moderately dilated, he should interpose a curtain before the window, sufficiently thick to break the rays of the light, without impeding distinct vision on his part, when the object of dilating the pupil will be effected, and due facility afforded for cutting up the capsule, and for evacuating the lens.

If the light has been well regulated and the capsule properly torn or cut, the lens will frequently follow the needle out of the eye, when a few moments of rest should be allowed. If it does not appear to be beginning to do so, the operator must endeavour to ascertain the cause, and especially to discover if it is dependent on any fault in the operation. If the incision of the cornea is not large enough, it must be increased with Daviel's scissors, or with a small knife, rounded at the point for the purpose. If the capsule has not been sufficiently divided, it must be now done; but if these important points have been duly completed, the operator must then assist in the expulsion of the lens; first, by giving or allowing motion to the eye-ball, by which a gentle pressure is made on it; and, lastly, by increasing it with the point of the finger. In the first instance he directs the patient to move the eye a little quickly upwards, by which the lens is frequently observed to move from its natural situation forwards, and at last, by the gentle pressure of the lid and muscles, to be protruded. If this should not succeed, the point of the fore-finger should be pressed gently on the lower part of the eye-ball, and the pressure increased until the inferior edge of the lens is seen to rise, when it is to be continued in a steady gentle manner, until the greater part is expelled. The evacuation of the lens at this period may be assisted by the scoop, and the falling of the lid ought to be simultaneous with his expulsion."

THE INCISION OF THE CORNEA UPWARDS.

This operation could be performed upon the right eye with some facility, because the surgeon can use his right hand. Guthrie says, the operation must be performed in the following manner. "The upper eye-lid must always be raised by the operator, who will stand behind the patient, and keep the head steady at the same time, in the position most convenient to himself, whether it be on a low chair or on a table, on in a bed, which latter I consider the safest." Says our author, "The incision must be made with the same precautions, and in the same manner, as in the operation downwards, save that the knife should be entered below the horizontal diameter, so as to make its exit proportionably above on the opposite side, by which the entrance of the hook for dividing the capsule will be much facilitated, and less danger accrue of the flap being caught by the falling of the upper lid. If the opening, made with the usual precaution, be not considered sufficiently large, it must be increased, which can be readily done by the blunt pointed knife, and with much less risk than in the operation downwards. The capsule is then to be opened in the usual manner directed; the evacuation of the lens solicited as in extraction downwards, with this exception, that when gentle pressure is necessary, it ought to be made from above, which causes the upper edge of the lens to move forwards rather than the lower, but which protrusion is also much regulated by the want of assistance opposed to it."

The after treatment in this operation is similar to all others. If the incision in the cornea does not unite in a proper time, and it fungates the nitratum argentum in solution, four grains to the ounce of distilled water, must be used, using caution in applying it to the cornea, we are advised after touching the eye-ball with the caustic solution, to inject between the lids and ball some tepid water.

KERATONYXIS.

OR THE DIVISION AND LACERATION OF THE LENS.

Says Mr. Guthrie, "The operations for the destruction of the capsule and the dissolution of the lens, by means of an opening through the cornea, are of two kinds, although very similar to each other. The first is that of Conradi, Beer, and Saunders, for destroying a central portion of the capsule equal to the size of the pupil, with or without a very gentle opening of the texture of the lens. The second is that of Buckham, Langenbeck, Walther, Reisinger and others of the German school, in which the whole of the lens is broken up, and the capsule destroyed, the pieces being brought into the anterior chamber of the aqueous humour, instead of being left in situ posterior to the iris."

"In both these methods, the belladonna should be applied the day before and on the morning of the operation, that the pupil may be completely dilated, and a few drops of a solution, in the proportion of five grains of the extract to a drachm of water, should be dropped into the eye, half an hour before its commencement, in order to prevent a contraction of the pupil during the operation, which otherwise sometimes take place. For the performance of the operation, or that of merely opening the capsule, a very small fine spear-pointed needle such as is recommended by Walther, of Landshut, and which resembles that of Beer, in every thing, save in being smaller, is to be passed into the cornea, about the eighth of an inch from the temporal side, at the same distance from its inferior edge, the eye having been previously fixed in the usual manner. When the point of the needle has arrived at the centre of the dilated pupil, it is not be plunged into the lens, but is to penetrate the capsule with a very gentle motion of the point of the instrument, and which motion is to be repeated, working in a lateral direction with the point and shoulder of the needle, until a portion of it is destroyed in a circumference which does not exceed the natural size of the pupil. Having acted upon the centre of the capsule, the needle may be gently sunk into the substance of the lens, and its texture moderately opened. The needle is then to be withdrawn." Mr. Traverse, before operating for cataract, used the extract of belladonna mixed with an equal portion of distilled water, he smeared it upon the upper lid or between the brow and cilia, and kept the parts moist by a repetition, in order, says our author, "to admit of its absorption, the frequency of the application must be determined by its effects upon the pupil, the preternatural dilitation should not be permanently maintained; for if it be, the pupil will in all probability be misshapen when the use of the belladonna is suspended, and the iris recovers its power."

The method of operating by division through the cornea, is to be accomplished as follows: "The previous steps of the operation having been attended to in the same manner, the curved cutting edged knife held like a writing pen is to be introduced at the inferior point of the cornea, at such a distance from the edge of it as will allow the instrument to pass into the dilated pupil without injuring the iris, yet so far from the centre of the cornea, that the small cicatrix which ensues, may be below the lower edge of the pupil in its natural state. The concave part of the instrument being upwards, the convex part downwards. The knife being introduced, supported on the nail of the fore-finger, is to be steadily carried on to the upper part of the lens, into which it is to be sunk, and by repeated cuts, the anterior capsule is to be divided, and with it the substance of the lens itself; this being accomplished, the broken portions of the lens are to be brought forward with the flat side of the knife into the anterior chamber. Care must be taken not to injure the iris in these different movements; and when the knife is withdrawn, the belladonna should be applied so as to keep up the dilitation of the pupil, until all symptoms of inflammation have subsided; when if at the end of four or five weeks rest, the pupil does not begin to clear, the operation may be repeated, more especially if any portions of the capsule are observable, as the longer they are allowed to remain, the firmer and more difficult of removal they become."

Dr. Jacob prefers for the performance of keratonyxis, a fine sewing needle curved at the point, remarking that it hardly ever leaves a blemish upon the cornea.

He says, "The capsule can be opened to any extent; a soft or pliable lens can be actually broken up into a pulp, by pushing the curved extremity of the needle into its centre, and revolving the handle between the fingers; large fragments can be taken up on the point of the needle from the anterior chamber, and forced back out of the iris; or, if sufficiently soft, may be divided by pressing them against the back of the cornea with the convexity of the needle," &c. (Dublin Hospital Report, vol. 4, p. 224.)

The operation for capsular cataract, differs but little from that performed by Mr. Saunders. Mr. Guthrie remarks, "an operation for capsular cataract alone, necessarily implies the previous removal of the lens, either by absorption, or by an operation. When the lens is gradually removed by absorption, as it is in the infant, or in consequence of a direct injury by which the capsule is portionably torn, it shrinks, recedes from the pupil, assumes a dead white appearance, and is called cataract arida siliquoso or dry hulled, or coriaceous cataract." Opening of the cornea for the removal of this capsular cataract, is recommended by some authors; others again advise us to introduce the needle posterior to the iris, through the sclerotic coat, lacerate the cataract, and remove the pieces into the anterior chamber.

The compound operation, or displacement and extraction. This operation consists in introducing the needle through the sclerotic coat, breaking up the lens, and removing the pieces through an incision in the cornea. The different methods of proceeding that have been adopted on this principle, seem to owe their origin to the operation recorded by St. Yves* and Gleize.† The late Mr. Gibson, (see his work on Artificial Pupil and the extraction of soft cataract,) of Manchester, England, recommended that the needle should be introduced behind the iris and capsule, and the textan of the lens freely opened; and that as soon as the eye had recovered from the operation, an opening should be made in the cornea for extraction of the soft cataract with a curette. Mr. Gibson did not recommend it for hard ones, as he thought the usual operation of extraction preferable." This method of destroying the opaque crystalline, is pretty much abandoned at the present day.

*St. Yves, page 302, 1722. †Gleize, page 118, 1812.

OF THE OPERATIONS POSTERIOR TO THE IRIS.

COUCHING, OR THE DEPRESSION OF THE LENS BELOW THE AXIS OF VISION.

CALLED LIKEWISE THE OPERATION BY DISPLACEMENT.

Scarpa performed the operation in the following manner: "The surgeon should place his patient on a low seat, at the side of a window, which has a northern aspect, so that the light coming from it may only fall upon the eye which is to be operated on laterally. The other eye being covered, although affected with cataract, the surgeon ought to place himself directly opposite the patient, upon a seat of such a height, that when he is prepared to operate, his mouth should be on a level with the patient's eye. And in order to give his hand a greater degree of steadiness in the several movements which the depression of the cataract requires, the elbow should be supported upon the knee of the same side, which, for this purpose, he should raise sufficiently, by resting his foot upon a stool, or if necessary, also by placing a small hard pillow upon his knee. An able assistant situated behind the patient, with one hand fixed under the chin, should support the patient's head against his breast, and with the other, placed on his forehead, gently raise the upper eye-lid by means of Pillier's elevator, carefully observing to gather the eye lid against the arch of the orbit, without pressing upon the globe of the eye.

Supposing then the eye to be operated on is the left, the surgeon taking the curved needle in his right hand, as he would a writing pen, with the convexity of the hook forwards, and the handle in a direction parallel to the patient's left temple; should rest his fingers upon the temple, and boldly perforate the eye-ball in its external angle, at rather more than a line* from the union of the cornea and sclerotica, a little below the transverse diameter of the pupil, gradually moving the extremity of the handle of the needle from behind forwards, from the patient's temple, and consequently giving the whole instrument a second motion, until its bent point has entirely perforated the ball, which is effected with the greatest readiness and ease. The operator should then conduct the convexity of the needle upon the summit of the opaque crystalline, and by pressing upon it from above downwards, cause it to descend a little, carefully passing the point, at the same time, between the corpus ciliare and the capsule of the crystalline lens, until it be visible before the pupil, between the anterior convexity of the capsule of the lens and the iris. Having done this, he should cautiously push the hook, with its point turned backwards, towards the internal angle of the eye, passing it horizontally between the posterior surface of the iris and the anterior convexity of the capsule, until the point of the needle has arrived as near the margin of the crystalline and capsule as possible, which is next the internal angle of the eye, and consequently beyond the centre of the opaque lens. The operator then inclining the handle of the instrument more towards himself, should press the curved point of it deeply into the anterior convexity of the capsule and substance of the opaque chrystalline, and by moving it in the arc of a circle, should lacerate the anterior convexity of the capsule extensively, remove the cataract from the axis of vision and lodge it deeply in the vitreous humour, leaving the pupil perfectly round, black and free from all obstacle to the vision. The needle being retained in this position for a short time, if no portion of opaque membrane appear behind the pupil which would require the point of the instrument to be turned towards it, in order to remove such obstacles, (for with respect to the crystalline, depressed in the manner now described, it never rises again,) the surgeon should give the instrument a small degree of rotary motion, in order to disentangle it easily from the depressed cataract and should withdraw it from the eye in a direction opposite to that in which it had been introduced, that is gently inclining and turning the handle towards the patient's left temple." In this operation belladonna must be applied to the temples, or a sufficient length of time before operating with the object of producing a dilation of the pupil.

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*A line is the twelfth part of an inch.

The operation of displacement, says Mr. Guthrie, has been usually called that of couching or by depression; and whilst there was but one mode of doing it, the term depression was sufficiently comprehensive, and was not to be misunderstood; but since several methods have been recommended, not only differing essentially from each other in the operative process, but in the manner of displacement and the subsequent position of the lens, it is advisable to have a term for the operation generally, which may not interfere with, and lead to a false conception of each kind of operation individually.

Says our author, "I have, therefore, selected the operation by displacement, as expressive of the fact, without suggesting any precise ideas of the process by which it is accomplished; and this I consider the more necessary from perceiving, that in several works on this subject, authors in recommending one, or objecting to another method of operating, have argued more against what it suited their own purposes to refute, than what was actually acknowledged to be the practice or the fact, at the period in which they wrote. Thus, in inquiring into the merits of the operation by displacement, if we were only to notice the advantages and disadvantages which have been said to accrue from the ancient operation of couching or depression, we should be as far from a real estimate of the fact as we well could be in any inquiry, bearing a strong resemblance to truth and impartiality, but in which neither were observed. To obviate this, I divide the operation by displacement."

First, into operations posterior to the iris, containing, 1. Simple Depressions; 2. Depression of scarpa; 3. Reclination of Willburg and Beer." (This latter operation I have given place under the head of operations anterior to the iris; the printer, by the by, has made a gross error by using the word inclination, instead of reclination, and in fact, the form was printed before I discovered the mistake.) This latter operation of reclination our author ranks under the head "on the operation by displacement." He says, speaking of the operations posterior to the iris:

"1. Simple depression. This operation consists in dislodging the opaque lens from its natural situation, and placing it in the vitreous humour, so far from, and under the level of the pupil, that it may no longer impede the passage of the rays of light, or prevent vision, and is the simplest operation of the three.

It is fairly devisable into three parts: 1st, the introduction of the needle; 2d, placing it on the anterior surface of the lens; 3rd, removing the lens out of and below the axis of vision.

Our author says, "The patient is to be placed and the eye fixed in the manner recommended for extraction, the pupil having been previously dilated by the belladonna. The small spear pointed needle is to be held steadily but lightly, like a writing pen; the little finger resting on the cheek-bone or side of the orbit, so as to give due support to the hand, and prevent the needle from entering violently, or going too far, if the toughness of the sclerotica should require a considerable degree of pressure to be made. It should penetrate the sclerotica about a line and a half from the edge of the cornea, (not nearer than a line nor farther than one and a half) half a line below its horizontal diameter, to avoid the long ciliary artery; the point being directed towards the centre of the eye,* so that it does not enter directly on the lens and change its position, pushing it towards the nose; one flat surface of the needle should be upwards, the other downwards.† The triangular point of the needle is to penetrate in this direction, until the neck of the instrument has entered the wound. The first step of the operation is then completed, and the second begins with a double motion of the needle, which requires a little dexterity. The direction of the point of the needle is to be changed from the centre of the eye towards the nasal edge of the pupil, which can only be done by carrying the handle backwards towards the temple, and as it approaches this new direction, it is to be turned so far (a quarter of a circle forwards,) on its axis, that the flat surface, which at the commencement of the operation was upwards, may now be turned towards the operator. It is in fact, in the position it would be in if it had been introduced in the manner more commonly adopted,and it is to be passed on in its new direction until its point and flat surface are seen advancing behind the temporal edge of the pupil. It is carried on in the posterior chamber, between the iris and the cataract, until the point has fairly passed the nasal edge of the pupil,one flat surface is towards the pupil, the other pressing on the cataract. The second age is now completed. These two stages are equally applicable to the operation of reclination through the sclerotica, and the knife is in the same situation as it would be in for the division or breaking up of a soft cataract, save that it is not quite so far across the lens towards the opposite side."

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*Hey's Surgery, page 63. Beer, Letpaden, 888.

†Warner; page 95.

"The third stage commences by a double motion, resembling that of the second; the handle of the instrument is to be depressed so that the point of the needle may be elevated to the upper edge of the cataract,on which the broad flat surface of the instrument must be placed, by giving it a quarter turn backwards on its axis. The posterior flat face of the needle, which pressed against the face of the cataract, is now on its upper edge, and the needle is (excepting the elevation of its point,) in the same situation as when it was first introduced. The third stage is now completed by raising the handle and firmly depressing the cataract downwards and a little outwards. The handle of the needle should not be raised above the horizontal position, but it should be kept there steadily for a few seconds, to prevent the lens rising again, when the point is to be gently raised. If the lens remains depressed, the object of the operation is completed, and the needle is to be withdrawn in the same manner it was introduced, only with the motions in an inverse order. If the lens rises up after the instrument, the depression must be repeated, and again a third or fourth time, with a longer interval between each attempt, until it can be lodged below the level of the pupil."

Our author recommends for the performance of this operation, Beer's spear-pointed needle; "it is the spear-pointed needle formerly used, but made smaller and rounded at the neck. On the sides of the handle corresponding to the flat surfaces of the needle a small piece of ivory should be inlaid, to mark them and prevent error. It is introduced with the flat surface upwards and downwards, that there may be less danger of injuring the long ciliary artery and the cililary nerves. It is directed backwards to prevent its doing mischief, if it pass too forcibly into the eye, as it would then merely penetrate the vitreus humour, and also to avoid the lens, whilst at the same time it prevents the point of the instrument being turned or broken, which will often happen from a sudden motion of a fold of the conjunctiva, when the point is allowed to fall upon the eye-ball in an oblique direction forwards. The object is to pass the needle through the coats of the eye, viz: the conjunctiva, the sclerotica, the choroidea, the insensible retina, the hyaloid membrane, and a little way on into the vitreous humour, so that the neck of the instrument may turn in the slight opening made in these parts without materially separating their edges. It is passed into the sclerotica a line from the cornea, that the roots of the ciliary processes may not be injured; and it should not exceed the distance of a line and a half, and never two lines, or the sensible retina will be injured; the medullary or sensible portions of this membrane not extending so far forwards as the insensible or membranous portion of it."

"The instrument is now to change its position; instead of passing behind the lens, it is to be directed before it, and the flat surface placed against its anterior face. To effect this, it is obvious two parts are exposed to injury the ciliary processes and the lens itself. Beer and the occulists of the German school, would seem desirous of persuading us that this second motion of the needle can be accomplished without injury to the other; but I am satisfied, that however possible it may be to do it, still it is never done. When the double motion has been given to the needle, it is previously to pressing it on parallel to the iris, and its point is between the edge of the lens, covered by its capsule and the anterior circlar edge of the ciliary processes. The point of the needle in its progress, so as to be seen behind the pupil, must either raise or penetrate a portion of the processes, or pass through the edge of the lens. Of the two injuries, the piercing of the lens is by far the most important, not as to the injury done to the part, for that is of no consequence, but as it impedes, and in many cases effectually prevents the completion of the operation, by precluding the possibility of depressing the cataract. To enable the operator to depress and leave the lens in any given situation, it is absolutely necessary that it should have no sort of connexion with the needle by which it is depressed, or it will, in consequence of this connexion, follow the needle when it is elevated, and resume nearly its original situation. The same thing occurs, only in a more remarkable manner, in the operation for cutting up the cataract. If the needle in passing the front of the lens, has been entered too far back, it passes through the edge of the cataract, and to use a homely expression, pierces it like a fowl on a spit. When the edge is turned towards the lens to cut it in halves, and force is used for that purpose, the cataract recedes from the pressure of the shaft of the instrument; but the edge does not cut, and the operator soon perceives that the lens follows the motion of the instrument, that it is actually spitted upon it, that he can do nothing with it, and must withdraw the needle for the purpose of re-introducing it, clear of the lens. In some instances, if the very edge of the lens only be pierced, it will yield to a turning motion of the needle; but this is not to be depended upon; the knife must be withdrawn, and re-introduced, when the lens, separated from its attachments, will be found to roll or turn round it, can be depressed but with difficulty, and seldom or never cut up, if that be the operation attempted. I consider it then a point of great importance, and fully established in this operation, that the lens is on no account to be pierced, and that this object (the integrity of the lens) is to be obtained, if necessary, at the expense of the ciliary processes."

Our author does not believe that the dangers which are stated to result from puncturing the ciliary processes often occur in this operation, he remarks "that hæmorrhage may take place from puncturing the ciliary processes; he further states, that he has wounded these processes often without having to contend with any ill consequences. Finally, our author's operation is similar to Scarpa's.

In another place, he remarks, "It may possibly happen that the nature of the cataract has been mistaken, or the operator be in doubt, has chosen to make the experiment of depression. In either case, the surgeon must not lose his presence of mind, on finding that the needle passes through the cataract, in every direction, without apparently making any impression upon it, he must be prepared for such an occurrence and act accordingly. If the curved needle has been used, further attempts are not to be made to lower the cataract, but the needle is to be brought through the centre of it, with the convex part forwards; the point is then to be turned forwards and backwards, the needle rotated on its own axis, and the point made to describe a circle as large as the pupil, and immediately behind it, so that the capsule may be fairly torn in shreds in this part, and the aqueous humour allowed free access to the opaque lens, which will soon begin to disappear. The lens, however soft, should be as little displaced as possible in an accidental case of this sort, to prevent its falling forwards and irritating the iris; which part having been dilated by the belladonna, should be kept in that state until the inflammation has subsided. A case of this kind will often require a second operation to complete the removal of the lens. If the spear-pointed needle has been used, and the lens be discovered soft, the point of the needle is to be made to act on the centre of the capsule, in the same manner, and with the same subsequent precaution."

"In other cases, the lens will often be solid, the capsule thin, and recline easily or with so little pressure, when the straight needle is used, that this membrane will be merely slitted by it; great attention must be paid to this circumstance; the point must be directed towards the pupil, and moved backwards and forwards: as well as in every other instance, the needle should be used gently, and not with too much irregular freedom. The lens in some instances, is perfectly solid, so that on pressure being applied, it separates into two or more pieces. The surgeon has here the choice of depressing them separately, or if small, which is much better, of pushing them into the anterior chamber."

"I have already said, that if the lens be spitted, it will not, and cannot remain in the situation in which it is intended to place it; but sometimes this rising of the cataract depends on its retaining some attachments, as Warner, Scarpa, Hey, &c. have noticed. Warner recommends raising it up with the needle, so as to cut them; but I believe this will be best effected by carefully ascertaining the point of attachment, cutting it with the point of the needle, and again depressing it. In all cases of these manœuvres, the operator must always recollect that it is the flat surface of the lens, and not the edge of it that is to be laid against the bottom of the eye."

Mr. Mackenzie says: 1. "The needle is to be held extremely light in the hand, so that it may be moved easily in all directions. If it be grasped firmly by the fingers, the operator has comparatively no power over it, and is unable to execute the delicate movements required in the operations of displacement."

"2. When once the needle is into the the eye, no part of the depression or reclination is to be executed by a motion of the whole instrument in one direction, and the handle in another, so that the needle forms a lever of the first kind, the sclerotica being the fulcrum. Upon this fulcrum, the instrument ought to be moved with the least degree of pressure possible, and without any dragging of the eye."

THE DIVISION AND LACERATION OF THE LENS.

There are two principal operations performed at the present period for the division and laceration of the opaque lens. The one is that of Sir William Adams, the other Mr. Saunders. These operations differ but little from each other. The latter gentleman was satisfied with lacerating the lens, and suffering it to remain posterior to the iris in situ, to be dissolved by the aqueous humour, and removed by the lymphatics. The former, after having broken up the lens, removed it piece by piece, into the anterior chamber before the iris, to be removed likewise by the lymphatics, and solvent power of the aqueous humour.

"The operations for the removal of cataract," says Guthrie, "by breaking or cutting up the lens in its place, have grown out of the operations of depression, and are only applicable to those, whose consistence is soft, and which are easily divided by a sharp-edged needle. When depression was the operation generally selected, the impracticability of depressing an opaque lens was often felt in consequence of the needle passing through its substance in every direction. This circumstance, although long known and lamented, was not always found to prevent a cure; for, though the pupil could not be rendered clear in the first instance, it subsequently became so by what was supposed to be a subsidence of the broken pieces, but which is now known to be a removal in consequence of absorption. Mr. Potts* seems to have been the first who distinctly ascertained this fact, and established a method of proceeding upon it. He says, "I have sometimes, when I have found the cataract to be of a mixed kind, not attempted depression, but have contended myself with a free laceration of the capsule; and having turned the needle round and round between my finger and thumb, within the body of the crystalline, have left all their parts in their natural situation; in which cases I have hardly ever known them to fail of dissolving so entirely as not to leave the smallest vestige of a cataract. In a few instances, where I have had fair opportunity, I have pushed the firm part through the pupil into the anterior chamber, where it has always gradually and perfectly dissolved and disappeared, not producing pain or trouble while such dissolution was accomplishing." Guthrie says, "Mr. Hey,* who was a great advocate for depression, adopted nearly the same method of proceeding, and recommended a needle for the purpose, which is, however, too large to be generally used with safety. Scarpa† deviated in such cases from the operation already described in page 52, for hard cataract, by breaking up and pushing as much of the divided lens and its capsule into the anterior chamber as he could, with his curved needle. Mr. Saunders,‡ whose views had been successfully directed to the management of congenital cataract in children, tried several methods of proceeding, both posterior and anterior to the iris; first, by breaking up the lens and pushing it into the anterior chamber of the aqueous humour; and, lastly, by merely opening the centre of the capsule, and allowing the lens to remain in situ until removed by the absorbent process. Further experience has not decided in favor of the latter method, and I consider the former to be the better operation, as facilitated by the use of the two-edged needle, recommended by his pupil Sir W. Adams. This gentleman's method of proceeding is as follows: "Having secured the eye by making a gentle pressure with the concave speculum, introduced under the eyelid, I pass the two-edged needle through the sclerotic coat, about a line behind the iris, with the flat surface parallel to that membrane; it is then carried cautiously through the posterior chamber, without in the slightest degree interfering with the cataract or its capsule. When the point has reached the temporal margin of the pupil, I direct it into the anterior chamber, and carry it on as far as the nasal margin of the pupil, in a line with the transverse diameter of the crystalline lens. I then turn the edge backwards, and with one stroke of the instrument, cut in halves both the capsule and cataract. By repeated cuts in different directions, the opaque lens and its capsule are divided in many pieces, and at the same time I take particular care to detach as much of the capsule as possible from its ciliary connexion. As soon as this is accomplished, I turn the instrument in the same direction as when it entered the eye, and, with its flat surface, bring forward into the anterior chamber, as many of the fragments as I am able; by these means the upper part of the pupil is frequently left perfectly free from opacity. Cutting in pieces the capsule and lens at the same time, not only is capsular cataract generally prevented, but the capsule is also much more easily divided into minute portions, than when its contents have been previously removed.

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*Potts' Chirurgical Works, vol. iii. page 156.

"The needle which I employ in this operation is eight tenths of an inch long, the thirteenth part of an inch broad, and has a slight degree of convexity through its whole blade, in order to give it sufficient strength to penetrate the coats of the eye, without bending. It is spear-pointed, with both edges made as sharp as possible, to the extent of four-tenths of an inch.

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*Hey's Observations in Surgery, page 61.

†Scarpa on the Diseases of the Eye, by Briggs.

‡A treatise on some practical Points relating to the Diseases of the Eye, by the late J. C. Saunders, by Dr. Farre, chapter vi. on the Congenital Cataract.

Above the cutting part, it gradually thickens, so as to prevent the escape of the vitreous humour." Guthrie remarks,

"In performing the operation for dividing or breaking up a soft lens (and it should never be attempted on a hard one,) the operator may use either hand, in which case the lids should be elevated by an assistant; or he may sit behind the patient, as in extraction, which I prefer, and raise the lid and fix the eye himself, a speculum being necessary only in children. The needle being held in an easy manner, is now to be introduced, half a line below the centre, and at the distance of a line from the cornea, the pupil having been previously dilated by the belladonna, with one flat side backwards, the other forwards, the point being directed towards the vitreous humour rather than on a level with the iris, in order to prevent its being injured by any irregular motion of the eye. The *point* of the instrument having pierced the coats of the eye, the handle is to be depressed just so much as will direct the point of the needle into the posterior chamber of the aqueous humour, when it is to be carried on between the iris and the capsule of the lens until it passes across the dilated pupil, and the point is observed to be behind its nasal edge. The needle is now to be turned between the finger and thumb a quarter of a circle, so that the *upper* edge of the needle may be placed against the lens enveloped in its capsule; when, by a steady pressure, accompanied by a slight withdrawing motion of the needle, they are divided into two parts, nearly as possible in halves."

"The needle is introduced a little below the central diameter, in order to avoid the long ciliary artery, and more particularly for the purpose of placing the edge of the needle on the precise line, within, or on the surface of the capsule, which would not be done if the point of the instrument were entered at this spot externally; for half the width of the needle would be above or below the central line of the lens, according to the manner of turning it, on the quarter turn being made. When the edge of the needle is in contact with the capsule in its central line, or diameter, a moderate pressure causes the needle to sink into the lens through the capsule, provided they be not firm, or tough, and their complete division may be effected by it alone; but if the cataract be of a firm consistence, pressure will have the effect of carrying the lens backwards into the vitreous humour, but not of dividing it; a drawing motion being necessary to make the sharpest razor cut the hand; hence the necessity of the double movement of the instrument."

"If the lens should yield to the needle, and be completely divided, by its passing through it, an important part of the operation is accomplished, and it is to be completed by bringing the needle back in the incision it has made, in order that it may be repeated in the upper and lower portions of the lens and capsule, until they appear to be divided into small pieces, when the flat side of the needle is to be turned towards the operator, and as many as possible of these pieces are to be pushed into the anterior chamber through the dilated pupil. When this is accomplished, the operation will be completed, if the pupil be clear and transparent; but as this can seldom be so perfectly attained, and some portions of the lens and its capsule will remain behind the iris, the surgeon must move the needle freely upwards and downwards, or in such direction as he may conceive will more effectually destroy the capsule."

"When the needle is introduced and placed upon the anterior surface of the capsule of the lens, its point ought to be beyond, or at least as far as the nasal or inner edge of the lens itself; and, in some instances, will be under the inner or nasal edge of the pupil. When the needle is brought back after the first division of the lens, care must be taken that its point is sufficiently withdrawn to be distinctly seen clear of this part, or it may be injured. The temporal edge of the pupil may also be wounded at the same moment, in placing the edge of the knife on the lens, for the subsequent divisions of it, unless the flat side of the needle be turned towards the iris as it passes out of the first incision and over the surface of the capsule to the place where it is intended to make the second, when it is again to be turned on its edge; which precaution is the more essential, as the lens may be large and pressing against the iris, or the pupil may not be completely dilated."

"The degree of force necessary to divide the lens is sometimes so great, that, before the division takes place, the lens is seen to pass backwards into the vitreous humour; which, from the pressure thus made upon it, offers a resistance which enables the cutting edge of the needle to divide the cataract, on which it again resumes its situation; and a nearly equal degree of difficulty is experienced in cutting up the remaining portions, which, indeed, in some cases is scarcely effected, and a half or a quarter of the lens is brought at once into the anterior, or left in or depressed in the posterior chamber of the eye. In other cases, the solidity of the lens is such as to resist the pressure made by the knife, it is consequently carried back into the vitreous humour, past even its centre, when the re-action of this humour, pressing unequally against the upper or under half of the lens, causes it to turn over or under the needle, whereby it is separated from its capsule and all its attachments or support, and is loose in the posterior chamber of the eye. All further attempts to divide a lens, floating as it were in the vitreous humour, would be futile, for it turns round the needle whenever pressure is made on its edge. In such a case the surgeon has a choice of two modes of proceeding; either to depress the lens, or to place it whole in the anterior chamber, and then extract it. The depression is to be effected by what is termed reclination; that is, the lens is to be placed on its flat surface, and retained in that situation until it remains stationary. It will frequently, however, rise so much as to be seen, although it may not impede vision, and, being separated from its capsule, it will gradually be removed by the absorbents. When the removal of the lens is preferred, the needle is to be carried behind it, by means of the flat side of which it may in general be readily pushed whole through the pupil into the anterior chamber of the aqueous humour, from whence it ought to be extracted."

"The great necessity which exists for placing the edge of the knife on the exact central line or diameter of the lens, in the first instance, will now be duly appreciated, as the only manner in which a sufficient resistance can be obtained from behind; by causing the pressure to be diffused over a large surface, viz. that occupied by the whole posterior face of the lens. If the edge of the knife or needle be placed above or below the central line, the lens begins to turn over or up, almost as soon as the pressure is applied with sufficient force to carry it backwards; and in this way, it often slips at once through the pupil into the anterior chamber."

"If this operation has been attempted upon an eye in which the vitreous humour is not perfectly sound, and this state is not always discoverable; or upon one which is in a dissolved, or, as it is often termed, fluid state, the division of the lens will not always be effected; although it be sufficiently soft to cut readily if the vitreous humour were more healthy. The lens, separated from its capsule, will sink as it were, or be depressed of itself; or, if it should admit of a partial or complete division, the pieces will disappear in the same manner. In some instances, the eye will remain clear, and the pupil transparent; in others, the whole lens, or the pieces, will be observed to have risen and to be floating in the vitreous humour, but they subsequently disappear, unless the lens has been removed, or enveloped in its capsule, under which circumstances it shrinks and becomes rounder, but never is removed by the absorbents. If the vitreous humour be found in a dissolved state, the lens should not be extracted; the surgeon has then no choice of proceeding, reclination is his only resource."

"When this operation is attempted upon a lens which is in a very soft or gelatinous state, none of the difficulties enumerated are to be met with, but others occur equally deserving of attention. The size of the lens, which causes it to press against the iris, not only renders the passage of the needle between these parts more difficult of accomplishment, but exposes the iris to greater danger of being wounded. The gelatinous state of the lens allows the needle to pass through it in every direction, with the greatest facility; but its non-resistance renders the removal of it into the anterior chamber of the aqueous humour equally difficult. The object of the surgeon, when operating in this manner, ought to be, to effect the destruction of the anterior part of the capsule, in order to expose the lens to the action of the aqueous humour, the first effect of which is to harden and render it more solid, previously to its removal by obsorption; a circumstance which, whilst it facilitates any future operation, may prove immediately injurious, by irritating the posterior surface of the iris. To prevent this, and indeed to give to this operation, as in all others of the same kind, the best chance of success, the pupil should not only be fully dilated previously to the operation, but retained so for several days afterwards, or until any inflammation which may arise has subsided; pressure on, or friction against the iris will be avoided, and, what is of as much consequence, the divided portions of the capsule cannot adhere to the posterior part of it, whilst a greater opportunity will be given for the removal of the whole by the action of the absorbents, and a repetition of the operation be perhaps obviated. In such cases a second, and sometimes even a third operation will be necessary, before the pupil can be perfectly cleared, and these will be most frequently required when the capsule has not been fully divided, more especially towards its centre, and when the pupil has not been kept dilated. In the first operation, the attention of the surgeon must be directed towards the destruction of the centre of the capsule, as well as the breaking up of the gelatinous substance of the lens; and after the knife has sunk through and completely across its surface in several directions, the instrument should be withdrawn, so that the point may be directed upon and a little beyond the central part of the capsule, which, by repeated motions of the edge of the needle, upwards and downwards, and backwards and forwards, is to be destroyed. In a second operation, the attention will in general be required more to the separation of the adhesions which the capsule may have formed to the iris, than to protruding the portions of the lens which remain into the anterior chamber; and as the capsule thickens and becomes tougher with age, the sooner the operation is repeated, after the inflammation has subsided, where it is likely to be necessary, the more easily will this part be again cut up and separated from any attachments it may have formed. Sometimes, by a repetition of these operations, the whole of the lens will be removed, yet a considerable portion of capsule will remain in a thickened state, demanding then a different mode of proceeding, and constituting a *secondary capsular cataract.*

"When in any of these cases, or indeed of cataract generally, a portion of the iris adheres to the capsule of the lens, the disease obtains the name of an *adherent*, or *partially* adherent cataract, whether hard or soft. If the adhesion be general, it must have taken place as a consequence of inflammation; and the pupil will, in almost every case, be so much diminished in size as to render an operation for closed pupil necessary, which state of the eye will be subsequently treated of; but when only a small portion of the iris adheres to one side, whilst the remaining part of the pupil is dilated by the application of the belladonna, the operation must be begun by introducing the two-edged cutting needle in the manner already described, and carry-it over the surface of the lens until the point reaches the part of the iris which is adhering to the capsule; this adhesion is to be separated by a gentle insinuating motion of the needle, which when it is observed to pass freely between the iris and the lens, may then be turned, so as to complete the remaining steps of the operation, either by division or by displacement, or, if under fitting circumstances, by the compound operation of displacement and extraction, either of which I prefer, as completing the operation, to withdrawing the needle; and after the inflammation arising from its introduction, has subsided, attempting another operation for the removal of the lens. In all cases the application of the belladonna will be essentially necessary to maintain the pupil in a dilated state; but if the lens be left in situ, it will frequently be incompetent to prevent a partial if not a complete re-union of the separated parts, the presence of the lens, causing a greater degree of inflammation than would otherwise have taken place."

The following mode of after-treatment will apply to all operations posterior to the iris.

AFTER-TREATMENT.

"After the operation has been completed, examinations for the purpose of ascertaining whether or not the patient can see, are useless and improper. As the needle is withdrawn, the eye-lid ought to be allowed to drop, and need not be re-opened. A compress of folded linen should be placed over the eye, after it has been properly dried, and both eyes covered with a bandage, to prevent the admission of light, for a spasmodic action of the muscles might be induced from sympathy with the motions of the sound eye, and the cataract be displaced from its new situation. The patient should remain perfectly quiet in a dark room, and, if possible, for some hours in a sitting posture; no motion should be allowed to the head; the patient should be fed for three or four days on spoon victuals, such as light puddings, and the same precautions taken to obviate inflammation as in extraction. The eye may be opened on the third or fourth day, with the back turned to the light; when it will be found more or less inflamed, and must be treated according to circumstances. In general, the patient will be able to distinguish objects at this period, although light will appear of different colours, and in most instances, a green silk shade may now be substituted for the bandage.

"Sometimes a slight ecchymosis will be observed at the spot punctured by the needle, arising from a small blood-vessel having been injured, which appears alarming to the patient's friends, and occasionally gives a slight uneasiness to the eye, when the lid is passed over it; but it is in reality of no consequence, and disappears in a few days, without any application.

"When it has been necessary, to use the needle with freedom to lacerate the capsule, depress the lens, or separate its attachments, the edges of the puncture made by the needle in the coats of the eye, do not always unite, and a slight protrusion takes place, which is either the vitreous humour and its proper membrane, or, when the opening is too near the cornea, is caused by a protrusion of the choroid coat, connected with the ciliary processes and the iris, and gives a slight uneasiness in moving the eye, whilst it keeps up an action at the part, and red vessels are seen running on the conjunctiva and even sclerotica. In general it subsides gradually, and at last disappears, without the aid of any remedy, in much the same manner as a small protrusion of the iris through the cornea, and is often followed by the same irregularity of the pupil. If, however, it should prove troublesome, as an exciting cause of inflammation, a few drops of the vin. opii may be employed, or the guttæ argenti nitratis; or, if very rebellious, the argent. nitratum, in the shape of a fine pencil, may be applied to it, and a drop of oil put between the lids, to prevent inconvenience.

"Having combatted, and I trust effectually, the dread frequently entertained of hæmorrhage into the chambers of the eye, as a general result of a wound of the ciliary processes, whilst I admitted that bleeding did sometimes occur from a wound of these parts, when in a varicose or deranged state, it is necessary to mention, that it may also occur from separating the attachments of the lens to the iris, previously to or in the act of depressing it; but this hæmorrhage is rarely of importance; it may be sometimes even foreseen, and hardly ever prevents the completion of the operation. If the long ciliary artery be wounded, the blood frequently escapes by the side of the needle, but the bleeding is rarely so profuse as to oblige the operator to withdraw the needle before the lens is depressed, or sufficiently removed from the iris to prevent mischief. The blood thus thrown out will in general be absorbed without giving any trouble. If it be in greater quantity, filling up the anterior chamber, it ought to be evacuated by a small opening in the cornea, and the antiphlogistic system should be strictly pursued."

[The practitioner should not be too hasty in making his incision in the cornea with the view of giving exit to this sanguinous fluid. In a healthy constitution, the lymphatics will remove it in a short time without the necessity of further wounding the eye-ball. Furthermore, if in carrying the needle to the opaque lens, one of the large ciliary arteries are wounded, followed by much hæmorrhage, the instrument should be withdrawn, and no further attempts made towards the laceration or depression of the lens, until an absorption of the effused fluid has been accomplished.]

"These perceptible accidents may be accompanied or followed by others, less obvious but of infinitely more importance, as being dependent on more concealed and intricate causes. Of this number is violent vomiting, either coming on immediately or a few hours after the operation. This symptom, noticed by all the authors who have written on the subject, is properly attributed, by Heister, to nervous irritation, not arising, as he supposes, from consent of parts alone, but more tangible injury to the ciliary nerves, in penetrating the chroidea, or to the retina, from the lens pressing against the external tunics. It may also arise from the needle being entered too far back (at or beyond two lines,) by which the sensible retina may be injured; or by the point of the needle penetrating or overreaching the lens, in depressing or retaining it in a state of reclination, so as to wound the retina. The occurrence of vomiting is at any period unfortunate, as it may, from the exertion and shock, cause the lens to reascend, and, in addition to the injury already committed, prove a source of great mischief, by irritating the iris. Vomiting is, however, by no means so common an occurrence as it was formerly, since the parts to be avoided are better understood; and the operation of simple depression abandoned. It is not only arising from consent of parts or sympathetic, in the manner Rives has demonstrated. If the ciliary nerves only have been wounded or otherwise injured, inflammation of the iris is likely to be the consequence, requiring active antiphologistic remedies, combined with mercury, as soon as this state is perceived, whilst the irritability of the stomach should be allayed by opium, saline draughts, camphor, and subsequently, valerian, &c. as in cases of nervous irritation. In this case, the vision of the patient, if properly and actively treated, will not be ultimately much or at all impaired. If, on the contrary, the vomiting has been caused by an affection of the sensible retina, either from the point of the instrument or the pressure of the hard lens, it is likely to be more or less accompanied by pain, and attended by a greater or less defect of vision, or even perfect amaurosis. I will not assert that this is absolutely diagnostic of the nature of the injury; but in those cases which have come under my observation, or in which I have been consulted, there could be little doubt of the fact of the defective vision, and the constant pains having originated from pressure on or laceration of the retina. In these cases, although acute inflammation may be subdued, a low irritative inflammation will continue, be productive of great pain, and in all probability, give rise to a closure of the pupil, with secondary cataract, or terminate even in suppuration of the organ. The antiphlogistic regimen, alternatives, or nervous medicines, can only be palliative, they cannot cure, and the only hope of relief depends on our being able to move the lens from its situation; the vomiting sometimes does this, and gives us a hint not to be neglected; occasionally it rises spontaneously, and we find it recommended to shake the head violently, with the hope of obtaining the same object. If these fail, I should have no hesitation, in an extreme case, of introducing a needle, for the purpose of raising it; considering any evil more bearable than loss of sight, when accompanied by extreme pain and that relief ought to be sought for at any risk.

"When the rising of the lens produces, somewhat in the same manner, low irritative inflammation of the iris, from pressing against it, and this pressure continues, as is observable from the situation of the cataract, it is not only useless but dangerous to delay reintroducing the needle and removing the lens to a more harmless situation. The idea of operating on an eye in a state of irritative inflammation will be ultimately lost unless relief be speedily obtained. We read indeed of cataracts redescending spontaneously after they had risen up from their new situation; but such things are not to be depended upon; and as to the solution of the cataract, the eye will be lost before half of either of these objects can be accomplished. The increase of inflammation, which will ensue, will change the character of the complaint, and render it amenable to vigorous treatment, by bleeding, mercurials, and counter-irritants, while the removal of the irritating cause will permit our remedies to act with effect.

"Amaurosis may occur without any vomiting, and with little pain; in these cases the retina has been injured; the eye diminishes in size from the secretion of the humours being imperfect; a slight blush of inflammation is observable on the sclerotica for a considerable time, the pupil begins to diminish from low inflammation, it appears cloudy, as if a thin net-work were drawn behind it, which gradually becomes more opaque; the cornea shrinks and flattens with the general diminution of the eye; the iris, for the most part, becomes corrugated and convex, immoveable, and insensible to any degree of light; or if it be moveable, it is merely a vibratory motion, dependent on disorganization of the vitreous humour, where the pupil has not closed."

It becomes necessary for some individuals to wear glasses after the removal of the opaque lens, and those glasses which are more convex on the side next the eye, than anteriorly, suit for the absence of the lens; however, the person can better make a selection of such glasses which will answer him.

CONGENITAL CATARACT

Children come into the world occasionally with an opacity, of one or both lenses, which, upon a close inspection present nearly the same appearances of those incidental to the grown boy, or adult. However, there appears to be some difference in the consistency of the adult and congenital cataracts, for from statements made by Saunders and Wenzel, Sen. it seems in the congenital cataract, the capsule is opaque, the lens fluid and milky in the adult, caseous, or of cheesy consistency, hard, or fluid. The practitioner may discover a greater extent of disorganization in the eye-ball, than what is presented to him in the opaque lens.

It may occur, that while this morbid action is going on in the crystalline body in the womb, adhesion or adhesions, will form between the lens and posterior surface of the iris, resulting perhaps in much disfiguration of the pupil, or there may be conjoined with congenital cataract functional or organic derangement of the immediate organ of vision with glaucoma. Some authors say that congenital cataract becomes sometimes a hereditary disease. The same functional or organic derangement of the lymphatics, which I believed gave rise to cataracts in the adult produces the congenital cataract, and we may say this morbid condition of the lymphatics is in all probability brought about in consequence of some peculiar quality, of the liquor amni, unnatural position or growth of the fœtus, or a taint in the maternal system, either of a scrofulous syphilitic or scorbutic species, external injuries, &c.

There are but few operations performed for the removal of the congenital cataract differing at the present period, from the operations of the late Mr. J. C. Saunders, of London, and it appears the practicability of removing the congenital cataract at an early period, was first principally inculcated by that gentleman. With respect to the removal of the congenital cataract at an early period, authors recommend operating at different ages, some say two years old, others more. Mr. Gibson, of Manchester, England, performed the operation for congenital cataract, and fixed upon the age of six months, as a more suitable period. We shall presently quote our author's remarks upon the advantages of operating at so early a period. Many difficulties attend performing an operation upon the infant.

Mr. Saunders says, "The excessive mobility of the eye, the unsteadiness of the little patient, the small field for the operation, and the flexibility of the opaque capsule, are the difficulties with which the surgeon has to contend. The author overcame them by fixing the eye-ball with Pellier's elevator, controlling the patient, dilating the pupil with the belladonna, and by using a diminutive needle, armed with a cutting edge from its shoulders to its point, and thin enough to penetrate with the most perfect facility.

"The extract of belladonna, diluted with water to the consistence of cream, is dropped into the eye; or to avoid irritation, the extract itself is smeared over the eye-lid and brow. In the space of half an hour, or rarely exceeding an hour, the pupil is fully dilated, and the application should then be washed from the appendages of the eye. The child must now be placed on a table parallel with a window, from which the eye, that is to be submitted to the operation is farthest. Four assistants, and in stouter children five, are required to confine the patient. The first fixes the head with reversed hands, the second only depresses the lower lid with his fore finger, but also receives the chin of the child between his thumb and fore-finger, as in a crutch. By this means the play of the head on the breast is prevented, a motion which the child incessantly attempts, and which will very much embarrass the surgeon. The third assistant confines the upper extremities and body; the fourth, the lower extremities. The surgeon, seated on a high chair behind the patient, and taking Pellier's elevator in his left hand, and the author's needle in his right, if he is about to operate on the right eye, or the speculum in his right hand, and the needle in his left, if the operation is to be performed on the left eye, proceeds in the following manner."

ANTERIOR OPERATION.

I.—ON A CAPSULE CONTAINING AN OPAQUE LENS.

"The surgeon gently introduces the bow of the speculum under the upper eye-lid, his assistant at the same time depressing the lower, and at the moment he is about to pierce the cornea, he fixes the eye by resting the speculum with a moderate pressure on the eye-ball. The position of the operator enables him to do this with perfect safety, and by that consent which can only exist between the hands of the same person, he not only discontinues the pressure, by using the speculum merely as an elevator of the lid, as soon as his purpose is accomplished, but he with facility renews or regulates the pressure at any moment in which it may be required. He penetrates the cornea as near to its junction with the sclerotica as it will admit the flat surface of the needle to pass, in a direction parallel and close to the iris, without injuring this membrane. When the point of the needle has arrived at the centre of the dilated pupil, he does not boldly plunge it through the capsule into the lens, and perform any depressing motion; it is a material object with him not to injure the vitreous humour or its capsule; neither does he lift the capsule of the lens on the point of the needle, and by forcibly drawing it forward into the anterior chamber, rend it through its whole extent. Such an operation would dislocate the lens, deliver it into the anterior chamber, or leave it projecting in the pupil, and stretching the iris; and, although its soft texture, in the child should exempt him from any disorganizing inflammation, the most favourable result will be a permanently dilated iris, deforming the eye. He proceeds with a gentle lateral motion, working with the point and shoulders of the needle only on the surface and centre of the capsule, in a circumference which does not exceed the natural size of the pupil. His object is *permanently* to destroy this central portion of the capsule: merely to pierce it would not answer his intention, because the adhesive process will speedily close the wound. Having acted upon the centre of the anterior lamella of the capsule to the extent which he wishes, he gently sinks the needle into the body of the lens, and moderately opens its texture. In doing this he may, if he pleases, incline the edge of the needle, by which motion the aqueous humour will escape, and the lens will approach his instrument; but at the same time his field for operating will be diminished by the contraction of the pupil. The needle and speculum are now to be withdrawn, the eye is to be lightly covered, and the patient put to bed.

Inflammation is seldom excited by this operation on the child; but its first approach, marked by pain and unusual redness of the conjunctiva, or serious effusion under it, must immediately be arrested by the application of leeches on the palpebræ, and, in stouter children, by bleeding from the arm, followed by purgatives and a very low diet. Soon after the operation, the extract of belladonna should be applied over the eye-brow, to prevent, by a dilatation of the iris, the adhesion of the pupillary margin to the wounded capsule. Nature now performs her part of the cure, and the lens, loosened in its texture, and through the aperture in the capsule subjected to the action of the aqueous humour, is gradually dissolved and absorbed.

A single operation sometimes suffices, and the cure is completed in the space of a few weeks; but if the process does not advance with sufficient rapidity, the operation may be repeated once or oftener, interposing at least a fortnight between each operation. If the adhesive process has counteracted his former operation on the capsule, he will take care now to effect the permanent aperture in its centre, and he may use greater liberty than at first in opening the texture of the lens.

Some have supposed that the fluid cataract is not only the most frequent, but the most manageable of the congenital cases. Both suppositions are erroneous. It is not only the least common, but the fluid when extravasated, sometimes excites a hazardous inflammation. In these cases, after puncturing the anterior lamella of the capsule, and discharging its contents into the anterior chamber, it will be prudent to desist for the time, and to guard against inflammation; by this operation the case will be converted into a capsular cataract."

II.—ON AN OPAQUE CAPSULE, ITS LENS HAVING BEEN NEARLY OR QUITE ABSORBED.

"The surgeon may in this case use the needle with much more freedom than in the lenticular cataract; but in other respects he proceeds in the manner above described. If any portion of the lens remain as a small nucleus or scale in the centre of the capsule, his efforts will be exclusively directed to detach this portion, by which he will fulfil the intention of the operation, that of effecting a permanent aperture in the centre of the capsule. But although the lens be completely absorbed, and only a capsule of a dense reticulated texture be opposed to the needle, he will still attempt to make a breach in its centre; for if it yields at its circumference, the pupil will be more or less covered with it, and the operation will be imperfect; because this thickened capsule is never absorbed, and the pendulous flap is incapable of presenting a sufficient resistance to the needle to admit of its being removed by a second operation. It sometimes happens that the texture of a capsule, on which the first or second operation has made no impression, will break up under the repeated touches of the instrument in a subsequent operation. Having fulfilled his principal intention of securing an aperture in the centre, if the capsule yields readily to the instrument, the surgeon during the same operation may lacerate its circumference, to render the pupil clear in its utmost degree of dilatation, always remembering that this liberty ought to be taken only in cases that are capsular."

POSTERIOR OPERATION.

I.—ON A CAPSULE CONTAINING AN OPAQUE LENS.

"The needle is passed into the eye at the distance of a line behind the junction of the cornea with the sclerotica. If the surgeon chooses to exceed the line, he is still more secure; for the nearer he approaches the junction of the tunics, the more liable he is to an accident, which will for the time defeat his operation. As the iris is intimately connected with the corpus ciliare, this ligament, if the instrument be entangled in it, will be detached from the sclerotica, to which tunic it has a very slender attachment; and the iris itself will appear to be torn from its insertion, the blade of the instrument being seen between it and the sclerotica. This accident is rather frequent, but it is never followed by any untoward result, if the instrument be immediately withdrawn. As soon as the needle has penetrated the tunics, he gently depresses its handle so as to direct its point towards the capsule through the thin edge of the lens; and steadily projecting its flat surface between the capsule and lens, he arrives at the centre of the capsule, which he opens, taking the same precaution as in the anterior operation, not to rend it extensively, lest he should dislocate the lens. He now cautiously opens the texture of the lens, and withdraws the needle. In his subsequent operations he will complete the central aperture in the capsule, and then loosen the texture of the lens, suffering the flocculi to fall into the anterior chamber, but not projecting into it any considerable portions of the lens, for the process of its solution and absorption is best accomplished in its natural position."

II.—ON AN OPAQUE CAPSULE, ITS LENS HAVING BEEN NEARLY OR QUITE ABSORBED.

"In penetrating the eye-ball, the point of the needle must be directed with a sufficient degree of obliquity backwards to avoid the iris, which, in consequence of the absorption of the lens, may have receded more into the posterior chamber. The handle of the instrument must afterwards be depressed, so as to direct the point around any central nucleus or a scale of the lens, for the purpose of detaching it. If the lens be wholly absorbed, the observations which have already been made on the anterior operation in capsular cases, apply to the present. The flexibility of the capsule is so great, that in attempting to rend its centre with the edge of the needle, a backward or depressing motion is often unavoidable. The surgeon has more power in the posterior than in the anterior operation; but the latter excites less pain and inflammation, and inflicts a slighter, if any injury, on the vitreous humour.

"The number of operations which may be necessary to accomplish the cure of a congenital cataract will very much depend on the texture of the capsule and the size of the lens. It is frequently cured by a single operation, more frequently it requires two, often three, sometimes four, but very rarely five. The period of cure, will, of course, depend on the same circumstances. Some are cured in a few days, the greater number in one or two months, in many the process is protracted to three, and in a few to four, or even five months.

Farre says, "The following is the total result of the author's operations on the congenital cataract. In sixty patients he succeeded in giving sight to fifty-two. In thirteen of them he operated on single eyes. In two of these, one of whom was an idiot, a pupil of each was completely cleared; but the retina being insensible, the operation was not attempted on the other eyes. In a third the result is not noted, except that he considered it a hopeless case when the operation was tried. A fourth was altogether unmanageable, being not only afflicted with congenital blindness, but also deafness. In a fifth the eye was lost by suppuration. In the remaining eight he was successful; of these five had each previously lost an eye; one by variola, and four by operations performed by other surgeons; three resulting from attempts to extract. In forty-seven patients he operated on both eyes. In one of these, who was an idiot, no vision was obtained, although a permanent aperture was made in each capsule. In a second the operation was completely successful on one eye, but failed in the other by the supervention of acute inflammation which closed the pupil with lymph. In a third, the operation proved unsuccessful in both eyes, by the result as the last—a closed pupil from adhesive inflammation. In a fourth, the consequent inflammation passed into suppuration, but the other eye was cured. Two were under care at the time of his death, one of whom was already cured in a single eye. Forty-one were cured in both eyes.

"These operations were performed on patients at the following ages: Five, from two to nine months; nine, from thirteen months to two years; four, from two and a half to three years; five, from three and a half to four years; eight, from four to six years; seven, at seven years; eight, from seven to nine; ten, from nine to fifteen; four, from twenty to twenty-eight. Thirty-eight of these patients therefore were at the interdicted ages, but the operation failed in only two of them: in one, at the age of three years and a half, who had an insensible retina, and was an idiot; in the other, at the age of seven years, by adhesive inflammation."

Mr. Gibson says, "In the operation of couching children, it has always appeared to me, that the advantages to be gained by restoring vision at so early a period, are so important as to bear down any obstacles which may be opposed to the safe use of the needle. Even the risk of deranging the figure of the pupil forms no solid objection to its use; and may always be avoided by steadiness and management, should even a slight change in its figure be produced, it is seldom in the least detrimental to distinct vision; and can scarcely be considered a blemish in the eye of any one, except in that of a geomatrician, who may easily reconcile to himself the presence of an oval opening, where one of a circular form should exist. It may farther be observed, that if an operator cannot depend upon his management of the eye, so as to render it steady by the introduction of the couching-needle, he can avail himself of the assistance of a speculum, to restrain its motions.

"The following observations will apply principally to infants under twenty months old. The advantages which an operator possesses in operating upon a child of this age, as compared with a child of three years old or upwards, are important. An infant is not conscious of the operation intended; it is free from the fears created by imagination, and can oppose very feeble resistance to the means employed to secure it with steadiness. At an early age, it has not acquired the power of retracting the eye deep in the socket, so that the operator has always a good prospect of introducing the couching-needle with care, by watching a proper opportunity. The eye has not at this time acquired the unsteady rolling motion which after a few years, is so common and remarkable in children born blind, or reduced to that state soon after birth, so that this impediment to the needle does not exist in infants a few months old. The operator also has it in his power to administer a dose of opium, sufficient to render the steps necessary to expose the eye almost entirely disregarded by his patient. With respect to the state of the eye itself, but particularly that of the cataract, this is more favourable for the operation than at any future period of life. In infants the cataract is generally fluid, and merely requires the free rupture of its containing capsule, which is generally opaque. The capsule, however, is tender and easily removed by the needle, so as to leave an aperture sufficiently large for the admission of light. The milky fluid which escapes from the capsule, is soon removed by absorption. If on the other hand, (says Mr. Gibson) the cataract should be soft, it is generally of so pulpy a softness, that the free laceration of the anterior part of its capsule, and the consequent admission of the aqueous humour, insure its speedy dissolution and disappearance, without the necessity of a second operation. Should the cataract happen to be hard, there will be no more difficulty in depressing it than in adults. The advantages, (observes Mr. Gibson,) which an operator will possess, when he attempts the removal of a cataract in a child of a few months old, are peculiar to that period. In proportion as the age of the patient advances until he arrives at the age of discretion, and can estimate in some measure, the value of sight by feeling its loss, the difficulties opposed to the use of the couching needle, his fear of the operation, the unsteadiness of the eye, and his power of retracting it within the orbit, present considerable, but not insuperable obstacles; such, however, as every surgeon would willingly dispense with.

"Before an operation at an early age is recommended the practitioner ought (as at any other age) to ascertain that the cataract is not complicated with a defective state of the retina, or with a complete amaurosis. Such cases are by no means uncommon. Some years ago, I recollect to have seen five or six children, the families of two sisters, who were all totally blind, and in an idiotic state, with cataracts, accompanied by amaurosis.

"Few practitioners at all conversant with cases of blindness from birth, will deny that it is highly probable that the eye may lose a considerable part of its original powers, from the mere circumstance of its having so long remained a passive organ. Hence, probably, it happens, that in some cases of congenital cataract, the only benefit conferred on the patient by an operation, is that of enabling him to find his way in an awkward manner, and to discriminate the more vivid colours. Such patients have never been able to discern small objects, or to judge in any useful degree of figure or magnitude. I am well aware that in some rare instances, such a defective state of the eye exists from birth.

"Another circumstance which must have attracted the attention of oculists, is, that in a few years, the eye of the patient born blind, acquires a restless and rolling motion, which is at length so firmly established by habit, that he has little control over it. This motion unfortunately, continues for a considerable time after sight has been restored to such person, and is a very material obstacle to the early attainment of a knowledge of the objects of vision, not being capable of fixing his eye upon an object for any sufficient length of time, acts as a great barrier to the perfect view of objects. These can be remedied by an early operation.

"Mr. Gibson not being acquainted with the effects of belladonna upon the iris in causing a dilation of the pupil, used before he commenced his operation a sufficient quantity of opium to produce drowsiness. In this state, the infant would remain for some time with its eye-lids half closed with the white sclerotic well in view, and could now be properly secured without much resistance, or the receiving much hindrance to introducing the needle, but in some cases where the infant had passed his twelfth or eighteenth month, he found it necessary to envelope it in a kind of sack opened at both ends, and furnished with strings to draw round the neck, superior and inferior extremities, sufficiently to secure them, and the assistant steadied its body and arranged its head, while the infant was placed on a table upon a pillow. Mr. Gibson hardly ever had recourse to a speculum, having uniformly experienced that after introducing the couching needle, he could command the eye, assisted by a little pressure upon the eye-ball, with the index and middle fingers of his left hand, which he employed in depressing the lower eye-lid; he used Scarpa's or Hey's needle, but prefers the needle of Scarpa, introducing his needle in the selerotic coat, nearest its union with the cornea, and performed nearly the same operation as was performed by Scarpa on the adult.

"Mr. Ware advocated and practised the use of Pellier's speculum, before operating upon the congenital cataract. Nevertheless, in some cases, he used his fingers, especially when the patient had advanced the age of infancy, his previous steps consisted in enlarging the pupil with belladonna, diluted with water, and applied an hour before the time of operating; he recommended placing the infant upon a table of a suitable height, with a pillow under its head. If the right eye was to be operated upon, the surgeon without he was left-handed, stood behind the patient, and in this position he could manage the elevator and introduce the instrument without an assistant. In this position of his patient, Mr. Ware introduced an instrument about the eighth of an inch from the margin of the cornea in the sclerotic coat. This instrument resembles the one recommended by Cheselden for making an artificial pupil, with which Mr. Ware thought the cataract could be broke down with facility and certainty. Its blade is so narrow pointed, that it looks like a needle; its end is pointed, and it cuts on both sides for the space of about the eighth of an inch, the other side being blunt. It is perfectly straight, is an inch long in the blade, and forms a complete wedge in the whole length.

"The instrument being introduced with the blunt edge turned downwards, it was pushed onward until its point had nearly reached the centre of the crystalline. The point was then brought forward until it had passed through the opaque crystalline and its capsule, and was plainly visible in the anterior chamber. If the cataract was fluid, and the anterior chamber became immediately filled with the opaque matter, Mr. Ware deemed it advisable to withdraw the instrument, and defer farther measures until the matter was absorbed, which absorption usually took place. In the course of a few days, and sometimes of a few hours, if no visible change was produced in the pupil, the point and cutting edge of the instrument was applied in different directions, so as to divide the opaque capsule and lens into small fragments, bringing them forward into the anterior chamber; the instrument can be retained in this position for a few minutes provided caution is used in not doing injury to the iris. If the cataract was found very hard, he advises that it be depressed below the pupil; (the hard cataracts are very uncommon in young people.) Mr. Ware hardly ever drew blood from his patients after the operation, but kept them upon a cooling antiphlogistic regimen; he had to repeat his operation upon the same eye, but never did it until all the inflammatory action created by the first, had subsided; should the absorption of the fragments of the lens not be done in a proper time, he increased it by dropping powdered sugar into the eye once or twice a day."

Medical Treatment. But little has been effected in the way of restoring to the opaque lens its former natural consistency and transparency, by medicines; nevertheless, I am satisfied that some cataracts do occasionally occur, in which this disorganization could be arrested by a timely administration of suitable remedies. But it rarely happens that the practitioner is made known of the cataract, until the disorganization has arrived at such an acme, that nothing saving an actual operation restores the patient's vision.

A number of remedies are recommended for the cure of cataract, and among them, we find calomel given in small and repeated doses alone or combined, either with cicuta or opium; these have been given with the view of promoting an absorption of the effused fluid, in the substance of the lens. Some advise us to give mercury until much ptyalism is brought about; others say the systems should be only slightly rallied, or the gums made tender, and kept in this state for weeks and months.

Cold shower, and vapour baths, epispastics, counter-irritants, cathartics, emetics, &c. have been resorted too. Dropping into the eye occasionally stimulating mixtures, conjoined with spare diet, cupping and leeching from the temple and forehead. Perhaps some benefit would result from administering the iodine internally, in conjunction with the use of the moxa to be applied for some weeks over the temple and forehead. See Baron Larrey, upon the way of using the moxa.

REMARKS UPON THE OPERATIONS.

Among the operations performed for the removal of the opaque lens from the axis of vision, that of Sir William Adams seems more likely to crown the highest wishes of the patient and practitioner, than any other; indeed, his method I believe, has met the approbation of the medical world; upon the whole, it is an operation certain and effective towards the restoring of the patient's vision. Extraction and the old operations of reclination and couching, together with the compound operation, have pretty much lost their votaries. Mr. J. C. Saunders' method is as much practised upon the adult at the present day, as upon the infant. This gentleman, it has been remarked, was satisfied with lacerating the lens, and leaving it in its natural situation. However, the method of Sir William Adams, is far the most effectual way of destroying the opaque lens—that a speedier solution and absorption of the lacerated lens takes place in this latter operation, more so than that of breaking up the lens and leaving it in its natural situation, is a fact beyond any argument. In the first place, the lens being lacerated, and the pieces removed into the anterior chamber, they become as it were, extraneous bodies; and in the second place, the anterior chamber containing the largest portion of aqueous humour, of course then, there must be more solvent power in the anterior, than in the posterior chamber. But when the opaque body is lacerated, and suffered to remain in situ, posterior to the iris, this body now cannot be considered an isolated one, and in consequence of which, after it has been lacerated, and the aqueous humour is acting upon it, or a portion of it, another part may have its nutritious vessels, and a part of it become again organized; consequently requires a longer time for its removal. Furthermore, the posterior surface of the lens, being in close contact with the vitreous humour, assists in preventing materially the quick absorption and dissolution of that body, which would otherwise take place, were every part of it exposed to the aqueous humour.

For the well performance of these posterior operations, I conceive it of the greatest importance, that the practitioner have a thorough knowledge of the physiology and anatomical structure of the eye-ball, with a good conception at all times of the dimension of the chamber and the consistency of tissues, to know that after he has perforated the tough elastic sclerotica, his needle meets with no more resistance, until it arrives at the opaque lens, and after the needle has penetrated the tissue, much deliberation and calmness are requisite in passing the instrument onward to the lens; and moreover, in his efforts in achieving this part of the operation, he must be cautious that he does not thrust his needle through the iris and cornea, which would probably result in a total destruction of the organ.

When, then, the practitioner is going to perform his first operation for cataract, and now to avoid wounding such important parts as the iris, cornea and annulus gangliformis, if he use Scarpa's needle, and punctures the sclerotica in the place recommended, he will shun materially these accidents, which he would likely commit, were he to use Adams', Saunders', Hey's or Beer's straight needles. This little instrument of Scarpa's, being so curved at its point, it can be thrust into the eye-ball, and keeping its convex surface presented to the iris, its point carried to the lens, and that body lacerated, without running so much risk of wounding the parts above mentioned.

The practitioner may be called upon to operate for cataract, and finds the lens in actual contact to the posterior surface of the iris. In this condition of these parts, the posterior operations cannot be so effectually done; again, it may happen, that when the needle is placed upon the lens in the posterior operation, with the view of lacerating it, the lens slips through the pupil into the anterior chamber. In the first condition of the lens, if the needle is passed through the cornea, and the lens broken up with its attachments, it will suffice for its removal. In the second place, the lens will no doubt be dissolved by the solvent power of the aqueous humour, and taken away by the lymphatics in the course of time; but a quicker removal of it could be effected by introducing the needle through the cornea, and lacerating it.

Some authors recommend the practitioner, before introducing his needle in the sclerotic coat, to request the patient to turn the eye to be operated upon, towards the nose. I consider this preliminary step quite unnecessary, and likely to baffle the attempting at a proper introduction of the instrument. If then, instead of so fixing the eye-ball, the fore-finger of the operator's left-hand (if it be the left eye which he is going to operate upon,) be placed over the caruncula lachrymalis and side of the eye-ball, he steadies the globe considerably, and have it so presented to him, that he can see what he is about at the time he perforates the sclerotica, and finally be the means of accomplishing the wished-for part of the operation, the proper laceration of the opaque lens.

I will remark here, that the practitioner should never attempt the removal of the lacerated cataract, before the iris into the anterior chamber, until he has acquired that experience in the use of the needle, to justify him at removing the lacerated lens into the anterior chamber; for were he to attempt it without having become somewhat expert in his operations, there would be great danger of puncturing or incising the iris, wound the long ciliary arteries and nerves, which would blight his attempts at restoring the patient's sight.

In some individuals upon whom an operation has been performed, and when the lens and capsule have been sufficiently lacerated, eight or ten weeks elapses before a complete removal of the lacerated lens has been effected; but in some young subjects, the dissolution and absorption takes place in eight or twelve days.

ARTIFICIAL PUPIL.

With the intention of restoring to a patient his vision in a partial or complete closure of the pupil, a certain portion of the iris is incised or removed. This obliteration of the pupil is commonly the consequence of iritis; nevertheless, we may have this malformation as a natural deformity. We find inflammation of the iris one among the maladies which require for its immediate removal, a rigid antiphlogistic regimen; but when measures fail in arresting the inflammatory action, a closure of the pupil inevitably succeeds.

One among the most remarkable and conspicuous phenomena in iritis, is the excessive contraction of that tunic, so as nearly to destroy vision in its infantile stage. Now, if the iris is suffered to remain in this contracted condition, for any length of time, coagulable lymph is thrown out either upon its posterior or anterior surfaces, which agglutinates together, the pupillary edges.

There are many ways of forming an artificial pupil; however, we shall select those which appear the most applicable to the accomplishing this desired object, the removal of a part of the iris, for the admission of the rays of light to the retina. Before describing them, we will quote a few remarks from Mr. Traverse. He says, "from morbid alterations of the cornea, or iris, or both, result those several states of the organ, which suggest the formation of an artificial pupil. The disease may be simple, that is affecting exclusively the cornea or the iris, or it may be complicated, and involve both textures."

With this obliteration of the pupil, and morbid condition of the cornea, there may exist a still greater concatenation of disease; an adhesion may take place between the capsule of the lens and uvea, or no adhesion; but an opaque lens, "a prolapsus of the iris, though an ancient breach or section of the cornea involving more or less of the pupillary margin."

A closure of the pupil may be conjoined with one-half, three-fourths of opaque cornea, and sometimes a case may occur wherein one-half of the iris has adhered to one-half of the cornea. Furthermore, an individual may have with an obliteration of the pupil, a glaucomatous staphylomatous or paralysed condition of the immediate organ of vision.

Mr. Stratford says, "We must be careful, however, previous to performing any operation, to attend to the exciting cause of the defect; mark whether it proceed from disease, or was produced by some local injury. If it is the effect of disease, we must endeavour to discover if the retina has been implicated, or if it still possess such a degree of sensibility as to afford a rational hope of success; if the patient can distinguish light from darkness, and the anterior chamber of the aqueous humour be healthy, of its proper dimensions, and the eye otherwise appear free from disease, we have every chance in our favour; even, however, should he be unable to discriminate light from darkness, we must not hastily condemn theattempt. For-an opacity of the lens or its capsule, may assist to form the impediment; if, however, with total blindness, he has been long subject to red flashes, or sparks in the eye, attended with much pain, we shall generally find the operation useless; but even here did the eye appear otherwise quite healthy; I think we should give him a chance, after having properly explained the probable result; but should the veins of the choroid coat be in a varicose condition, the vitreous humour disorganized, or the eye affected with glancoma, we must not attempt it, for these equally contra-indicate its utility, and give us reason to think that it would do more harm than good, by exciting an unhealthy action in these parts." I am rather an advocate for testing the effects of an operation, when ever there is the smallest grounds for some success.

We know that in certain conditions of the eye-ball, to perform the operation for artificial pupil, would prove abortive. They are such as complete opacity of the cornea, or staphylomatus protrusion; but to say that we can prognosticate the event of an operation, where a paralytic condition of the retina is suspected, I cannot admit as being based upon good principles. By certain phenomena, the retina may convey to the mind of the practitioner, an idea of a total abolition of its functional powers; but when its proper stimulus is again admitted to impinge upon it, its functional office may probably return, if not completely, peradventure in a partial degree." Our author further says, "that the constitution of the patient to be operated upon, should be examined, and that if an inflammatory habit is manifest, we should reduce his system; if on the other hand, to be bettered by suitable tonics and proper food." Before operating for artificial pupil, the same preliminary steps which were recommended to be taken in cataract, are applicable in operating upon the iris. 1st. Deplete, if the patient is corpulently inclined, previous to performing an operation. 2d. Keep his alimentary canal free for the first hours from all such rich articles which are likely to overload his stomach, or excite action of the heart. The operator can now have the succeeding inflammatory action considerably under his control, by using these precautionary measures. Indeed, I conceive it requires no little nicety of judgement, in properly combatting with the inflammatory symptom; it may occur, that after the operation has been performed with all the skill and judgment of a Beer or a Guthrie, the looked for favorable issue is blighted by the inflammatory action.

The following method of operating, is recommended by our author: "The patient being seated in a chair, and desired to direct the eye towards the nose. The upper eye-lid is elevated. An iris capsule, with its edge turned directly backwards, is then to be introduced about a line and a half, or two lines, posterior to the junction of the cornea, with the sclerotic coat; for if he pass it much anterior to this point, he may strike upon the ciliary legament, and so detach the iris from its natural connection; then passing in its transverse diameter, the point must be pushed through the iris into the anterior chamber, at about a third of its width from the ciliary margin; the scapel is then to be passed onwards, taking care not to detach the pesterior surface of the cornea. The iris is then to be cut by a sawing motion, until we have divided its central third; this is accomplished with various degrees of facility, in some instances flying apart upon the slightest touch, at others requiring repeated attempts to accomplish it, while its union with the capsule of the lens may be so firm, that it will separate at the ciliary ligament, rather than give way in the centre; if this accident should occur, we instantly desist, and change the kind of operation. When we have made the necessary cut in the iris, we are gently to separate its edges with the knife, so as to enlarge the opening; and, now, should the lens have previously been removed, the instrument is to be withdrawn; but should that body remain in its natural condition, or only its capsule, we must cut it into many pieces, and separate them from their connections, that they may have been taken up by the absorbents, and so removed from the axis of vision; this, however, is seldom accomplished in the first attempt; but if any portion of the capsule remain attached to the canal of petit, or have formed a union with the posterior surface of the iris, it may be removed by the needle at a subsequent period. If we find the lens is hard, and not likely to be soon absorbed, we must endeavour to push it through the cut in the iris, which, under these circumstances, should be made rather larger than is general recommended, so as to facilitate the attempt to pass it into the anterior chamber; when we get it there, we must make an opening in the cornea of sufficient size to extract it; but should it fall back into the vitreour humour, it may be a source of irritation to the retina, and perhaps cause amaurosis, while it may move about in the eye, raising or sinking according to the position of the head. In this case, I think it would be advisable to make a small opening in the cornea, introduce a fine pair of forceps, or a hook, into the anterior chamber, pass it through the opening in the iris, seize the lens, and bring it into the anterior chamber, then having waited for a time, we should enlarge the wound in the cornea with the scissors, and quickly draw it out;" (would it not be better to make the incision in the cornea sufficient large for the escape of the lens, with one stroke of the knife, without the necessity of cutting into it the second time?) "this will require the greatest care, for possibly the vitreous humour may already be in a disorganized condition, so as to be forced out with the slightest pressure. If in the early state of the operation, we happen to separate the iris from the ciliary ligament, we had better make an opening in the cornea with a cataract knife, then introduce a pair of lancet-edged scissors, and cut out a portion of the iris so separated, while at a subsequent period we endeavour to remove the cataract by the means which its kind or consistency may indicate. Directly after the performance of any of these operations, we must apply the extract of belladonna to the temple, so as to keep the pupil dilated to its fullest extent; for this is a circumstance of considerable importance, on which the successful termination of our attempts will often mainly depend; we should likewise, by way of prevention, abstract a certain quantity of blood, according to the condition of the patient; while, at the same time, we watch the accession of inflammatory action, and when sufficiently obvious, have recourse to the means recommended in the treatment of iritis."

Mr. Traverse says, "For *central opacity eclipsing the pupil*, its section is to be made with the cornea, from two to three lines in length. This being done by a gentle pressure upon the opposite side of the eye-ball, the iris protrudes in the form of a little sac or bag at the wound, which is to be snipped off with a fine pair of scissors. The iris then recedes, and presents a permanent aperture more or less circular. The corneal section may be made on either side of the pupil as required. This merit of the highly ingenious operation, (says our author) is due to the late Mr. Gibson. It is applicable only to the above state, for if the pupil is closed and in adhesion with the capsule, or adhesion exist between the iris and cornea, no protrusion will take place. In making the section, it is very important that the direction of the knife should be perpendicular to the cornea, for if its passage is oblique, the cicatrix will be so much extended as to obscure the new pupil. On this account the practice of Professor Beer to draw out with the forceps, and excise the pupillary margin, more completely answers the intention."

Cheselden is reputed to have been the first who performed the operation for an artificial pupil; his method consisted in incising the iris transversely, by introducing the needle through the sclerotic, one line posterior to the cornea. This method did not seem to answer, for Janin attempted it twice, but found the incision to close upon the subsidence of the inflammatory action. Scarpa who likewise imitated cheselden, met with the same result. "Janin having failed in his first efforts to perform an artificial pupil, and observing accidently, in extracting a cataract, that the vertical incision he made of the iris, did not heal as the transverse, was induced to attempt the operation by practising a perpendicular section. His success in this new method fully equalled his expectations, and was quite complete in four cases which he narrates. Several succeeding oculists have imitated the practice of Janin, but the result would scarcely justify the strong encomiums bestowed by its enventor. This operation of Cheselden has now but few advocates both in England and upon the Continent, and these are to be found only among those who contend for the circular and radiated fibres of the iris. Maunoir, of Genoa, is among the number; and in his work, Sur l'organization de l'iris, et l'operation de la pupille artificielle, has entered into a very elaborate disquision of this doctrine. (A translation of these Memoirs by Mr. Young, may be found in the 17th volume of the Medical and Physical Journal.) M. Maunoir supposes, contrary to the opinion of the first anatomists, the iris to be composed of two sets of fibres, essentially muscular, and forming two distinct bundles. The one composed of nearly parallel fibres, extends, as radii of a circle from the large circumference to the lesser circle of the iris. The other commencing where the first terminates, continues to the pupil; the fibres forming a number of concentric circles, which make out what is termed the *circulis minor*, to the first fascilulus he gives the name of musculus dilator, and to the second musculus contractor. Professor Maunoir practised his operation with a scissor peculiarly constructed for the purpose. The one of the blades which was to enter the iris, was very sharp at the point; the other, which was somewhat longer, and intended to pass between the iris and cornea, was blunt, and furnished at the end with a small button or knob, to prevent its becoming entangled with either of these coats. From the general want of success which attended the practice of the operation on the Continent, the French, and afterwards the Germans, were much disposed to doubt the veracity of the English surgeons; but the difference in the result is supposed to be easily accounted for, from the different circumstances of the cases operated upon. It is presumed that we know of but one condition of the iris, in which we could look for a favorable result from this mode of operating, when the membrane appears stretched and tense across the eye, and such may have been the precise circumstances under which Cheselden operated. The operation has of late years been revised again in England by Sir William Adams. This gentleman performed the operation in the following manner. "The patient being seated as in the operation for cataract, and the eye being steadied by the finger of an assistant, a small knife, about a line broad, and eight in length, with its edge turned backwards, is introduced through the coats of the eye about a line behind the iris, and in its traverse diameter. The point of the instrument is then made to penetrate through the iris into the anterior chamber, in a line with its central diameter, and somewhat less than one third of the width of that membrane from its ciliary margin. The knife is then to be carried through the anterior chamber towards the inner canthus, keeping its edge in contact with the iris, (in order to prevent its point from piercing the internal part of the cornea,) until it has traversed more than two-thirds of the width of the iris, when it should with great care, be drawn backwards almost out of the eye, making the most delicate pressure with the edge of the instrument against the iris, lest it should be detached from the ciliary ligament.

"If the division of the iris is not effected to a sufficient extent during the first effort, the iris scapel is to be again carried forward, and withdrawn in a similar way. This is to be repeated as often as may be necessary, to effect a division of the iris, to the extent of a third part of its diameter.

Professor Schmidt, has given to the operation just described, the name of Coretotomia, to distinguish it from two others we are now to notice. The former signifies incision of the iris, without loss of substance; the second, or Coretonectomia, an incision of the iris, with loss of substance; the third, Coretodyalisis, the separation, or tearing assunder of this membrane from the ciliary ligament.

"Wenzel, Sen. was the first to propose and put into execution, the practice of cutting out a portion of the iris, to remedy the inconvenience which had so often resulted from the closure of the wound accosding to Janin's method. He commenced by making an incision through the cornea, with the cataract knife, as if to extract the lens; but when the point of this instrument reached about half a line from the centre of the iris, he plunged it through this membrane, and brought it out again, about the distance of three quarters of a line from its entrance. In this manner he completed with a simple sweep of his knife, two semilunar incisions; the one of the cornea, the other of the iris. Small scissors were then introduced under the cornea, and the divided portion of the iris cut away."

"Guerin has in several instances succeeded by modifying a little the process of Wenzel.—Having finished the section of the cornea, he made a crucial incision of the iris, and then removed the four angles of the cross with a pair of scissors. Dr. Frick observes "although the two methods here described seem to remove entirely the objection made to Cheselden's operation, they are attended with disadvantages of a still more serious nature. Not to mention the extreme difficulty of the operation itself, it is always accompanied with great irritation and inflammation, and many even cause the entire destruction of the organ." Mr. Gibson, of Manchester,* has advised a different method of excising a portion of the iris. The primary steps of his operation, is the securing of the palpebræ as in the operation for extracting the cataract. "A puncture is then to be made in the cornea, with a broad cornea knife, within a line of the sclerotica, to the extent of about three lines. All pressure is now to be removed from the eye-ball, and the cornea knife gently withdrawn. The consequence of this is, that a portion of the aqueous humour escapes, and the iris falls in contact with the opening in the cornea, and closes it like a valve. A slight pressure must now be made on the superior and nasal part of the eye-ball, with the fore and middle finger of the left hand, till at length, by an occasional and gentle increase of pressure, or by varying its direction, the iris gradually protrudes, so as to present a bag of the size of a large pin's head. This protruded portion must be cut off with a pair of fine curved scissors, and all pressure at the same time removed; the iris will then recede within the eye and the portion which has been removed will leave an artificial pupil more or less circular." Professor Beer† recommended the following method of performing corectomia. "Having made an incision of the cornea about a line in length, and as near to the scleratica as possible, the iris, if it is no way adherent to the cornea, will be protruded between the lips of the wound, of which the surgeon immediately avails himself, by laying hold of the prolapsed part with a small cataract hook, and cutting it off as close as possible with a pair of Daviel's scissors. The remainder of the iris immediately shrinks back, and a well shaped pupil is evident. If the iris, however, adhere, in any part of its border, with the cornea, the operator is to introduce a small hook, in such a manner as neither to wound the iris nor the cornea; and endeavour to seize the pupillary edge of the iris, and, drawing it out, cuts it off, as before directed. Lastly, where the iris is connected with the cornea, at the spot where the pupil is to be formed, the larger circle of this membrane, should be seized by means of a hook, or if this tears out, by a fine pointed and indented forceps; and the iris thus torn is to be drawn out if possible, and cut away. Sometimes, it is even necessary to introduce the scissors within the incision to cut away the part which has been seized by the forceps, and thereby prevent the too extensive laceration of the iris."

Guerin says, "the iris is very easily separated from the ciliary ligament; a circumstance never to be lost sight of in operating for cataract, &c.

The practice of Coretodyalysis was not introduced till the year 1802 when it was first made known by Dr. A. Schmidt, in Germany, and by Scarpa, about the same time, in Italy, we are at a loss to which of these gentlemen to ascribe the priority, as both have obtained the merit of its first discovery. Assalini affirms to have practised this operation as early as 1787 at Reggio, and Buzzi, an ocluist of Milan but one year later; but neither of these gentlemen made their practice generally known until many years after the works of Schmidt and Scarpa had made their appearance. Various modes have been devised and adopted for performing this operation—however the most important will be noticed. As performed by Scarpa—"The patient being seated and secured as for the operation of cataract, a couching needle, is made to pierce the sclerotica, about two lines from its union from the cornea.—When the point has reached the upper and internal part of the border of the iris, it is thrust into the membrane, at a small distance, from the ciliary ligament, until it is perceptible in the anterior chamber. This step of the operation requires attention, as this part of the chamber is very narrow, and the instrument may become entangled in the cornea, which lies close upon the iris. The surgeon is then to press, with the needle, the iris from above downwards and from the internal towards the external angle of the eye, so as to detach a portion of its border from the ciliary ligament. When this is obtained the point of the instrument must be depressed so as to rest upon the inferior angle of the wound, which may be rendered as large as necessary, by drawing the iris towards the temple. If the pupil then be found clear, the needle is withdrawn, but should there remain any portion of the opaque lens or its capsule obstructing the orifice, it is to be broken down, and brought into the anterior chamber for absorption.

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* Practical Observations on the formation of Artificial Pupil, London, 1811.

† Lehrbuch von den Augenkrankheiten, &c. Wien, 1819.

Scarpa, [*] from the late edition of his work appears to have relinquished this mode of operating as he has found by experience, "that the newly formed oval pupil becomes in process of time *filiform*, and consequently useless." After noticing the various modes practised by Donegana Flagani, Adam, Gibson, Beer, and others, he seems disposed to prefer the method of Maunoir.

Schmidt, "instead of piercing the sclerotica, in the manner of Scarpa, and entering, the iris from behind, made a section of the cornea with a lancet shaped knife, opposite that where he intended his artificial pupil; and introducing a small hook or pair of forceps, seized upon the iris near its ciliary border, and tore it from its attachment."

Assalini[†] taking notice of the successsful improvements which had been made in this operation, recommended another of his own. "Having made a section of the cornea, he introduces a species of forceps, in one extremity of which being pointed, is easily made to pierce the iris. The apices of this instrument are dentated, and made to close most accurately, so that having laid hold of the iris, he was able to detach it with the greatest facility from the ciliary ligament." It seems professor Beer has abandoned pretty much the practice of coretodyalysis and practices that advised by Reissinger, "which consists in strangulating the iris with a double hooked forceps, between the edges of the cornea. The operation must be begun near the outer edge of the cornea, and if possible three lines distant from that part of the iris which is to be separated. The incision of the cornea is best made by the lancet shaped knife, and should never exceed three lines in length, or the prolapsed part cannot be sufficiently strangulated, the double hooked forceps closed is now introduced through the opening of the cornea. "Carcied forward in a parallel direction to the iris, and with the points downwards, till it reaches as near as possible the ciliary edge of the iris. The forceps are then to be turned, that the points of the hooks may be directed towards the iris, and the blades slightly opened, and sunk into the iris. The surgeon now closes the forceps again, at the same time that he draws them towards the opening of the cornea, and gently and easily disengages the iris. In this manner, a considerable part of this membrane will be separated, which is brought through the wound of the cornea, and left to unite with the cicatrix; producing thus a species of prolapsus iridis. When the iris shews any disposition to retract, and the first or second effort is not sufficient to retain it between the edges of the wound, it will be proper to cut off the part of the iris which has been separated, thus uniting coretodyalysis wth corectomia."

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[*] A Treatise on the principal diseases of the Eye, by A. Scarpa, translated by James Brigg's, London 1818.

[†] Recerche sulle pupille artificiale, Milano, 1811.

Muter, in 1811 promulgated the following way of operating. "The border of the iris, towards the external angle of the eye, is the most convenient part to be operated upon; and we shall at present suppose this to be the situation in which the artificial pupil is to be formed. In this operation the eye must be steadily fixed, the greatest precision being necessary."

The operator taking a very fine thin couching needle pierces the sclerotica immediately behind its junction with the cornea, in the line of its transverse diameter: the point of the needle should barely puncture the inner coat lest it wound the capsule of the crystalline. The needle should be entered as if it were the intention of the operator to push the margin of the iris scissors, which are so constructed that the blades when open to the distance of about half a line, are parallel to each other, to the extent of four lines."

The point of one blade is rounded off and blunt, the point of the other is sharp and thin, similar to a spear pointed couching needle. They open by a spring, and, like the forceps, have only one long handle. The blunt-pointed blade is to be entered into the puncture of the sclerotica, the other blade will be opposite the margin of the cornea, through which it is to be pierced. The points of both blades being then directed forwards, till opposite the margin of the pupil, the border of the iris will be included between them. The points should now be turned towards the lower margin of the pupil, and closed, by pressure with the fore-finger on the short handle; an incision of the whole breadth of the border of the iris, beginning in the line of its transverse diameter, and extending to the lower margin of the pupil, will thus be made. The points being now allowed to be opened by the spring, are next to be turned towards the superior margin of the pupil and again closed; another incision of the whole breadth of the border of the iris will be made, beginning in the line of its transverse diameter, and extending to the superior margin of the pupil."

"Thus will a triangular portion of the exterior border of the iris be removed. The scissors being withdrawn, the small hook is to be introduced, and the divided portion extracted through the incision."

"During this operation, the aqueous humour will not be evacuated until the scissors are withdrawn, consequently they can be used with the greatest precision. the parts of the eye retaining the natural tention and situation."

"The incision thus made will not exceed two lines in extent; and if proper care be taken in piercing the cornea. and in closing the scissors, it will not be in the least ragged, but the lips clean and smoothly cut. Although a portion of the exterior border of the iris is most conveniently removed, yet the superior or inferior border may also be removed in a similar manner. The incision will be sufficiently large to permit the extraction of the divided portion of the iris, and as it extends but a very little way into the cornea, not more than a line, cannot be the cause of any cicatrix to obscure the artificial pupil."

Professor Walther "opens the cornea for about two lines and a half, with a small cataract knife, either in a straight or in a oblique direction, from the transverse diameter of the cornea, downwards or upwards, as the case may require. Through this opening the iris protrudes, if it be not too strongly attached. If it should not protrude but lie against the wound, he seizes it with a pair of forceps, and cuts it off."

Professor Autenrieth of Tubingen, conceived that an operation could be performed through the sclerotica when complete opacity affected the cornea. Beer tried it one case but failed Guthrie met with the same failure in two cases. The operation is called selerotikectomia by the Germans. It is to be attempted in the following manner. "A curved needle with a cutting edge is to be passed under the sclerotica close to the cornea, with the convex part towards the eye, and made to cut itself out by which a small flap is made in the sclerotica, and which is to be enlarged by the blunt-pointed iris scissors, when an irregular triangular opening is made nearly of the size and shape of the artificial pupil. The chorrid coat must next be removed to the same extent as the selerotica and in doing it care must be taken not injure the hyaloid membrane. As the wound heals the sclerotica closes in; and in those cases I have seen the new formed substance so opaque, as to prevent any benefit resulting from the operation."

Accidents occasionally attending the formation of an artificial pupil, after treatment.—Mr. Mackenzie remarks that "Many of the accidents which are apt to attend the formation of an artificial pupil, are similar to those which accompany the operations for cataract, and need not be particularly insisted on. A few, however, are peculiar. 1. By every mode in which an artificial pupil is formed, blood is apt to be effused; much more in separation, however, than in the other operations, and much more when the iris is altered from its natural texture in consequence of inflamation. In separation, the trunks of the blood-vessels which nourish the iris are torn across, especially when the new pupil is formed towards the temporal or nasal angle of the eye, while after long continued inflammation, the iris is thickened and loaded with blood. The bleeding after separation, and sometimes after excision, is so considerable, that it goes on for a few minutes through the wound of the cornea, filling the aqueous chambers, the blood prevents us from making any experiments regarding the degree of vision likely to be recovered by the operation. In 24 hours, in general the pupil becomes clear, indeed, it is remarkable with what celerity a large quantity of blood is absorbed from the aqueous chambers.

2. Little or no pain attends incision and excision; but it is otherwise with seperation, owing to the tearing across of the ciliary nerves, attendant on this method of forming an artificial pupil. The pain of separation is always considerable, and often severe, rendering necessary the use of opium after the patient is put to bed. During the operation, the assistant requires to be on his guard, lest the patient suddenly moves away his head, when he feels the pain, which might lead to the separation of a much greater portion of the iris than the operator intended, or would be consistent with useful vision.

3. Should the operator find that he has formed too small a pupil to be very useful, he ought immediately to enlarge it, either by repeating the operation which he has been performing, or converting it into some of the compound operations described in the last section. It must he observed, however, that an artificial pupil will often appear small immediately after it is formed, and while the eye is drained of aqueous humour, which after the eye becomes plump again, will be found fully a medium size."

4. When too large an artificial pupil has been formed, so that the eye is dazzled even by moderate light, it is necessary that the patient should shade the eyes, or wear a piece of paste board or light wood, concave within and convex without, blackened on both sides, and pierced in the centre with a small round hole of the size of the natural pupil. This will enable him to see at least all large objects, although he will probably be unable to distinguish small ones even with the aid of this contrivance."

5. The treatment of patients who have undergone an operation for artificial pupil, has reference chiefly to the danger of inflammation. The patient for some days must remain in bed, his eyes excluded from bright light, and his diet strictly antiphlogistic. Belladonna may be applied when the pupil has been formed by incision or excision, but ought to be avoided (at least immediately) after separation, should pain in the eye, or round the orbit, supervene, venesection ought freely to be used, and followed up by the application of leeches, calomel and opium ought instantly to be begun, in such doses as are likely speedily to affect the mouth, and continued till all danger of iritis appears past. The inflammation excited by an operation for artificial pupil often partakes of the strumous character, and not unfrequently is

strumo—catarrhal. Depletion in such cases, does not require to be carried to the same extent as when the inflammation is internal; and much benefit will be derived from the administration of the sulphate of quinine."

Authors advise when one eye is affected with closure of the pupil and the other amaurotic not to perform the operation for artificial pupil upon suspicion only that the eye effected with an obliteration of the pupil must be amaurotic too. This seems to me something worse than nonsense to say that because one eye is amaurotic the other must participate in the disease.

I consider it a duty incumbent upon the practitioner to operate for artificial pupil and not be guided by the one amaurotic when there is the smallest ray of hope for restoring the patients vision.

The after treatment. It is recommended to keep the parts about the eye moist with the extract of belladonna until the inflammatory symptoms have subsided, with the view of keeping up a dilatation in the newly formed pupil. After the operation the patient should be confined to a moderately dark room until all inflammatory symptoms have completely abated. The patient must be fed with light food and if much pain and inflammation follows, to be checked by the antiphlogistic regimen, a light bandage should be bound round the eye operated upon.

"It often happens that they in whom an artificial pupil has been formed, present in the first instance, but very dubious signs of sensibility of the retina so much so, that the operator may be led almost to despair of a restoration of sight. I have known a fortnight elapse after all signs of inflammation had subsided, before the patient could tell one finger from another, and yet very tolerable vision be recovered."

In some subjects who have been long labouring under a closure of the pupil and upon whom an operation has been successfully performed and the inflammatory symptoms subsided the patient attempts to go about out doors, but finds the light acting too strongly upon the sensible retina producing a contraction in the newly formed pupil, preventing the rays of light properly striking upon the retina. This exquisite sensibility of the immediate organ of vision can be remedied by wearing shades.

REMARKS UPON THE OPERATIONS.

The reader has now read of a number of methods for forming an artificial pupil. "There are two varieties of excision, the lateral and the central. The latter, which, as has already been stated, was the invention of Wenzel, is now very nearly abandoned, the former, which appears to have been first had recourse to by Beer and afterwards by Gibson, is one of the most common modes of forming an artificial pupil." This latter operation may answer in perhaps the generality of cases, but if any attachment exists between the capsule of the lens and iris no protrusion follows. It then becomes necessary to remove a portion of the iris from the ciliary ligament, either of a semilunar or triangular shape. However, I believe it rarely happens that any attachment exist between the iris and lens, and the operation of opening the cornea, allowing a portion of the iris to protrude through the incision, and then snipping it off, appears the most applicable and easy of accomplishing.

OPHTHALMIÆ.

In the concatenation of diseases incidental to the human constitution, I know of none that deserves more the attention of the practitioner than the Ophthalmiæ.

The man who loves to dwell in contemplation upon the laws and operations of nature, he in viewing the human species in the full bloom of health and youth, is involuntarily captivated by the expression and form of the organ of vision, but when he enters more minutely and discovers somewhat the office it performs, his admiration and wonder is still more heightened in reflection upon that ingenuity and wisdom displayed in its formation by an omnipotent being.

We find in the eye-ball the most singular and wonderful construction, and consent of parts, so that several square miles of landscape is brought to such a small and necessary focus which impinging upon the retina giving us the elevation of different parts, the rich foliage in spring, the variegated in autumn,and the thick sturdy beach beside the majestic oak. What then must be the size of this picture when painted upon the retina? Extremely small,though containing nearly all the peculiarities of the landscape. This the sophist and sage studies in sombre amazement. And in the eye of the young maiden is seated power and control—she will root deeply in the bosom of her courtier black despair or raptuous feelings. The parent plods his way, leading his offspring in a black and tempestuous night, guided by the glimpses of a star. The eye is the portal of the mind, rob man of this organ, which loves to view the works of nature,and he becomes a blank in creation.

Remote or predisposing causes of Oph'halmiæ, are commonly found in the constitution, consisting in either a syphilitic, scorbutic, scrofulous, arthritic or rheumatic diathesis, any of the Exanthemata. Abdominal or thoracic irritation, paralysis, general debility, leading a sedentary life, the reading of books by candle light, &c.

Exciting causes —Exciting causes can be traced to Atmospheric viscissitudes,floating particles, the fumes of acids, foreign bodies insinuated between the conjunctiva and lids. penetrating any of the other tissues, a determination of blood to the head, sleeping with the head too low, exhalation from animal or vegetable substances when in a state of decomposition, the reflection of the sun's rays from hot sandy shores or plaines, making microscopical observations, &c. Furthermore, the exciting causes may originate in the constitution, such as the metastasis of morbid matter from a carcinomatous tumor or an ulcer communicated to the eye-ball producing a change of structure in the different tunics.

Proximate or immediate cause.—Some discrepancy of opinion exists respecting the proximate cause of inflammation. Sir Astley Cooper in speaking of the proximate cause of inflammation, says "The state of the blood does not tend to the production of inflammation; and the opinions formerly entertained of the increased thickness of this fluid in inflammation are now known to be diametrically opposed to the fact, as the blood is rendered more than usually fluid by it. If a part which is the subject of inflammation be examined, the following are the appearances which I observe.

"The tail of the tadpole is the best transparent part of the animal for making these observations: in the web of the frog's foot the vessels are less conspicuous. When the tail of the tadpole is placed under the microscope, a surface appears intersected by rivulets of blood, in which the red particles may be seen rolling on in a most beautiful current. The part is now irritated either by slighly wounding it, or by the application of an acid; almost immediately the velocity of the circulation appears to be increased in a few minutes, little branches of vessels appear to be growing out of the sides of those before visible, into the transparent part; these vessels are now seen receiving a red particle, or particles of blood, which gradually advance in them, forced forwards by a vis-a-tergo, until they reach the begining of the corresponding vein; and then this vessel being larger than the artery, the red particles rush from the artery into it, and thus a new vessel appears to be created under the eye. It is not however, a new vessel, but a serous artery, which by the force of the action of the heart and of the surrounding vessels, becomes dilated, so as to receive red particles. When the red particles are observed in the vessel, they seem to advance by the pulsation of the heart, and then slightly to retreat; but not in proportion to their advance, and thus they gradually proceed.

The vessels of the inflamed part, on this account, appear to become more numerous; but it is only that they can now be seen from the difference of the fluid which they contain. They become very considerably dilated, and they seem disposed rather to yield than contract. This is what can be with certainty observed in these animals. With respect to man, we observe, that if a drop of nitric acid be applied on any part of the body, in three or four minutes a rush of blood takes place in the part, and it becomes red. In the parts near to that inflamed, a strong feeling of pulsation is produced, showing, that the action of the surrounding vessels is increased, and the heart, sympathising with it, has the velocity and force of its action augmented.

The vessels of the inflamed part then are found to be dilated but on the arteries feeding the inflamed part are also dilated; so that if a limb be injected, in which there has been any considerable extent of inflammation, the principal vessels, as well as their branches, have their diameters increased.

Inflammation is, therefore, a dilated state of the vessels of the part, and increased action of those in the surrounding parts, and the heart sympathising with the part determines a larger quantity of blood to the dilated vessels.

Illustration.— This process may be illustrated by what is frequently occuring in the organ of vision; a piece of iron lodges upon the eye, and becomes a source of irritation. A flow of tears is produced by the increased action of the lachrymal gland, to wash away the cause of irritation, so an irritation upon other parts of the body leads to the determination of blood to the part, to remove by subsequent processes the irritating cause."

With much defence to the observations and opinions of our author I must nevertheless dissent, believing that no increased swiftness of the blood takes place in the vessels of a part inflamed or in those adjoining nor any other peculiar change in the quality or consistency of the blood than what is present in the animal economy at all times.

If an extraneous body or fluid is thrown or made to come in contact with the mucous serous or any of the other tissues They act upon the tissues according to their irritating qualities producing in these tissues functional or organic derangement, resulting consequently in a change of structure or function in these tissues.

Now let us take for example, expose the conjunctiva to a current of cold air for a sufficient length of time, or insinuate under the upper or lower lids a spicula of metal or any other extraneous body, what follows? We shall have presently pain, heat, and tension in the part, with a copious excretion of the lachrymal fluid, succeeded by a change of colour in the conjunctiva, red blood has entered the serous vessels which vessels before conveyed the white blood.

This change of structure will be much controled by the peculiar stamina of the constitution of the patient, i. e. in the valetudinarian a less resistance will be offered in the serous vessels to the passage of the sanguinous fluid in them than in the athletic, or to speak more comprehensive, by a quicker relaxation of the serous vessels will take place in the former, than the latter. The current of air or foreign particle produces all the above phenomena imprimative, by bringing about morbid sensibility in the nerves belonging to the serous vessels. Which vessels I conceive have their proper nervous influence, and which influence sustains them in their proper calibres, now if any organic or functional derangement takes place in the nerves belonging to these serous vessels, a relaxation of them succeeds, which relaxation may take place in a quicker or longer time according to the extent of derangement in the nerves, followed consequently by the entrance of the sanguinous fluid in them. A number of serous vessels now carry the red blood, but this blood courses through them with no more swiftness than what can be seen at all times in any part unconnected with the one diseased. These vessels lastly being surcharged with the red blood, the nervous filaments put upon the stretch and the pressure of the vessels against the adjoining tissue or tissues produce pain and the sensation of tension, which pain or tension are increased or moderated according to the number of vessels relaxed. An effort is presently made upon the morbid part or parts by the vis-medicatrix-naturæ to remove this unaccustomed fluid in these serous vessels, (the red blood) which effort consists in a determination of nervous excitement to the distended vessels, with the object to bring about their former calibres

I ask what power is there in relaxed serous vessels or any other vessels adjoining those relaxed, to increase the circulation of the sanguinous fluid in the relaxed serous vessels. The determination of blood to the part or parts is nothing more than an effect of the relaxation of the serous vessels. Any constitutional taint or the irritation from a diseased organ may be communicated specifically to any tissue or part which offers the least resistance to the quality of the irritation or taint, and produce a change of structure—now any taint or the irritation from a deseased part may assail any of the tissues of the eye, they offering the least resistance. The taint or irritation act in like manner to the spicula of metal and current of cold air.

Hence it is that we have the most unbounded control over an inflamed tissue by general depletion, astringents and anodyne medicines, and the benefit which is derived from emetic tartar in keeping up a constant nausea reducing the action of the heart consequently the blood is not forced with so much rapidity into the serous arteries. In some cases when nausea is brought about in delicate constitutions, we can almost see the red blood recede or leave the serous vessels (taking the conjunctiva for examination) at this moment astringents and opium act most powerfully in bringing about a favourable crisis. It has been questioned whether more heat is generated in a part inflamed than one in a state of healthy action.

Mr. Hunter, to disapprove the existence of heat in an inflammed part, "made an incision two inches deep, in the gluteal macles of an ass, and into the wound he introduced a tin canula one and a half inch long, so that there was half an inch of wound below the canula; he then passed a plug of wood through the canula to the bottom of the wound, and confined it there so as to prevent any union by the muscles; this was on a Wednesday. Immediately after the wound was made a thermometer was introduced into it, and the mercury rose to 100 degrees exactly, as another did at the same time, which had been passed into the vagina, on the next morning the plug was taken out, and the ball of the thermometer introduced to the bottom of the wound; the mercury rose to 100 degrees; the plug was then again returned and secured as before. In the evening the experiment was repeated with the same result;

on Friday morning, the thermometer, when introduced, rose to 99 degress only; and, in the evening, it rose to 101½ degrees; on Saturday morning, when introduced again, the mercury reached 99 degrees: in the evening 100 degrees."

Several other experiments were tried, but none proved the fact that any other increase of temperature took place in the part inflamed, than what was present in the animal œconomy. However, I am left in some considerable doubt here respecting these experiments. We know the vagina of any animal is exceedingly prone to an increase of temperature, more especially from the presence of a foreign body.

That an increase of temperature from that of the body's natural standard is present in inflamed membranes, I have not the least doubt.

Whether this increase of heat is brought about in consequence of the presence of the red globules in the serous vessels, or from the increase of nervous excitement, which is thrown upon thepart in an effort by the vis medicatrix naturæ, to remove morbid action, is not easily ascertained, I am inclined to believe in the latter. To enter into a more minute disquisition of the subject under consideration, would be deviating from the tenor of this work.

We find inflammation situated in any one tissue of the eye-ball liable, like all other soft parts, to the same terminations, as into either an effusion of coagulable lymph resulting in adhesion, suppurations, sphacelous, or the inflammation, will, by a proper use of remedies, terminate by resolution, which is the most desirable result. We moreover find different symtoms and phenomena presented by each tissue, while in a state of inflammation.

REMEDIES FOR THE OPHTHALMIÆ.

Says Mr. Mackenzie, "It is a general rule of great importance in the treatment of any ophthalmia, to discover the cause whence it has arisen, and, if possible, to remove that cause, if it is still in operation. The cause may be purely local, or it may be constitutional; but in either case, if it be allowed still to operate, it is evident that every thing in the way of remedy must prove comparatively or entirely ineffectual.

Bloodletting.—"Opening a vein of the arm, the application of leeches round the eye, and division of the inflamed conjunctiva, are the three modes of taking away blood generally had recourse to in this class of diseases. The detracting of blood by opening the temporal artery, the external jugular vein, or the nasal vein, or cupping the temples, is seldom necessary. The three modes of bleeding first enumerated, cannot be substituted one for the other, and we should often run a risk of losing the eye, were we to attempt to cure by local, what will readily yield to general depletion, or *vice versa.*

"I know of no inflammatory disease of the eye which is curable by bleeding alone; and I look on the attempts to cure the contagious or Egyptian ophthalmia by taking away very large quantities of blood, till the inflamed membrane grows pale from depletion, as the veriest of folly; first, because even were this paleness produced, it could be no test of the disease being subdued; secondly, because a degree of blood-letting sufficient to produce even an approach to such an effect, would leave the patient in a state of great and unnecessary debility; and thirdly, because the disease could be cured by a much milder plan of treatment; all the ophthalmiæ require other remedies besides the taking away of blood; and therefore, while we value this means of cure very highly, we must by no means trust to it alone in any case." The very judicious remarks of our author here are certainly of great importance in the cure of the contagious ophthalmia, but I can confidently affirm, that in some cases where I have depleted to syncope producing this peculiar pallid colour of the conjunctiva, followed by the application of the nitrate of silver in solution, applied as an astringent, have checked inflammation in that membrane, which was likely to terminate in disorganization of the cornea.

In using the lancet for the ophthalmiæ, our author advises that a large orifice be made at the bend of the arm to admit a large stream. "So as to insure, if possible, a considerable effect on the impetus of the circulation."

"That leeches ought to be applied, in general, not on the loose substance of the eye-lids, but on the temple, forehead, and side of the nose, and in cases where there is a peculiar thickening of the conjunctiva, especially in infants, our author recommends one or two to be applied to the palpebral conjunctiva." Ophthalmia may become an epidemic, endemic or sporadic disease, in some seasons of the year, and appear in the latter part of the fall or winter, when leeches have but little power to suck. Cupping will then suffice in their place, to be done from the temples, forehead, and nape of the neck.

"Scarification of the conjunctiva of the eyelids, and sometimes that of covering the eyeball."

Mr. Wardrop practised evacuating the aqueous humour, which was highly extolled by him as an effectual remedy in some cases of ophthalmia.

Mr. Mackenzie recommends purgatives, and considers them highly efficacious in the cure of the ophthalmiæ. "An active purge of calomel and jalap is often sufficient of itself to check an attack, when employed early."

Says our author, "Emetics are of essential service in the treatment of various inflammatory affections of the eye." Emetics may prove beneficial after depletion in athletic subjects; they moreover commonly remove all matter from the alimentary canal of an irritating quality.

Diaphoretics "are useful in lowering inflammatory action in the eye, especially when suppressed perspiration has been, as it often is, the exciting cause of an ophthalmia. Our author says, but, after depletion, we employ this class of remedies as valuable adjuvants in the cure.

Alteratives.—"Of this class mercury is the chief; and without the aid of this medicine, we might regard the internal ophthalmia, and especially inflammation of the iris, as incurable. It is as a sorbefacient that mercury proves so useful in the internal ophthalmia, powerfully promoting the absorption of coagulable lymph, by an increased action of the absorbents.—Whether it accomplishes this directly, by actually stimulating the absorbents, or merely favours their action, by abating in some unknown mode, the inflammation, in which the effusion originates, we are unable to say; but in the sad result of the ophthalmiæ of this class when neglected, and the admirable effects of mercury, in preserving the open and transparent state of the pupil, in these diseases, are placed beyond all doubt.

"In the disease to which I have alluded, we employ mercury so as to effect the constitution, and in this way to operate on the eye; but in other cases we use it in smaller doses, in the expectation of deriving benefit from its well known effects on the secretory organs concerned in digestion." I conceive the good which calomel produces in the cure of the ophtholmiæ, and indeed in any other inflamed parts, is at the time the copperish taste and slightly tender gums are felt, that if it be carried to a greater extent the vis-medicatrix naturœ becomes much reduced, consequently her healing powers are much weakened.

Narcotics.—"Laudanum, rubbed on the forehead and temple, does much to relieve the pain; or if opium be taken internally, the better effects of this remedy can be obtained by combining it with small doses of calomel. I regard the form of calomel with opium as almost specific in the rheumatic and catarrho-rheumatic ophthalmiæ. Opium in vapour, and in fomentation, is employed directly to the eye in certain states of inflammation."

Refrigerants, our author disapproves of cold water. "A tepid lotion soothes and relaxes the inflamed membranes of the eye, and being evaporated at the expense of the superabundant heat of the parts, acts in fact as a refrigerant. Hence it is that I scarcely ever employ cold application or refrigerant solutions in the treatment of the ophthalmiæ. Nitre is recommended.

Astringents.—Among the astringents, our author highly extols a solution of the nitrate of silver and murias hydrargyri.

Stimulants and Escharotics.—"Under this head we include a valuable set of remedies; as, nitras argenti, murias hydrargyri, red precipitate, subnitrate of mercury, vinum opii, &c. In the internal ophthalmiæ, the application of most of these is destructive, while in conjunctival inflammations, more is effected by their means than by almost any other kind of remedy. The nitras argenti and murias hydrargyri are to be employed in solution, never in the form of ointment. No doubt a nitras argenti ointment has been recommended by Mr. Cleobury and others, but as it is perpetually undergoing a new degree of decomposition; it forms a remedy of variable strength, concerning the effects of which no certain conclusions can be drawn. The red precipitate, again, and the subnitrate of mercury, are used only in the form of salves. The vinum opii is applied either pure or diluted, and in certain chronic inflammations of the eye proves highly useful. Any attempt to employ it, or indeed any other single remedy, as a panacea in the ophthalmiæ, would manifest a total ignorance both of this class of diseases and of the uses of remedial agents."

Our author in another place says, "I have been induced to try a salve composed of five grains of nitrate of silver, rubbed to an impalpable powder, and mixed with one ounce of lard; and in chronic cases of puro-mucous ophthalmiæ, have found it highly beneficial."

Counter-irritants, blisters and issues, are recommended in the chronic forms of the ophthalmiæ.

Our author says that particular attention should be paid to the mode of living after an attack of ophthalmia; the diet should be light and easy of digestion; no exposure to inclement weather. Cleanliness and gentle exercise in good weather. I have no doubt but many a secondary form of ophthalmia attacks the individual in consequence of non-attention to the proper mode of subjecting the constitution to atmospheric vicissitudes, the use of light food and cleanliness. For a more detailed account of the operation and effects of remedies in the cure of the ophtalmiæ, see our author's work.

Our author enters into a very copious and elaborate investigation of the different tissues of the eyeball that are now and then subject to inflammation, each one presenting distinct symptoms and phenomena. His arrangement of the ophthalmiæ is as follows:—

I CONJUNCTIVITIS.
I Conjunctivitis, Puro-mucosa.
1 Catarrhal.
2 Contagious, or Egyptian.
3 Leucorrhœal, or ophthalmia Neonatorum.
4 Gonorrhœal.
II Conjunctivitis Scrofulosa.
1 Phlyctenular.
2 Pustular.
III Conjunctivitis Erysipelatosa.
IV Conjunctivitis Variolosa.
V Conjunctivitis Morbillosa.
VI Conjunctivitis Scarlatinosa.
II SCLEROTITIS.
1 Rheumatic.
III CORNEITIS.
1 Scrofulous.

IV IRITIS.
  1 Rheumatic.
  2 Syphilitic.
  2 Scrofulous.
  4 Athritic.
V CHOROIDITIS.
VI RETINITIS.
VIII AQUO CAPSULITIS.
VIII ANTERO-CRYSTALLINO-CAPSULITIS.
IX POSTERO-CRYSTALLINO-CAPSULITIS.
X VITREO CAPSULITIS.
XI CHRYSTALLINITIS.

APPENDIX.

1. Traumatic Ophthalmiæ.
2. Compound Ophthalmiæ, as the Catarrhal-rheumatic, pustulo-catarrhal, &c.
3. Intermittent Ophthalmiæ.

Our author says "he has admitted into the above table of the Ophthalmia none, the distinct and separate existence of which he has not either ascertained in the course of his observations, or been convinced of upon indubitable authority."

CONJUNCTIVITIS IN GENERAL.

"It may here be proper to recall to mind the extent and relations of the conjunctiva, that it lines the internal surface of each lid, covers the anterior third of the eyeball, passes over the cornea, although differing considerably in texture at that part from what it is in the rest of its extent, that it insinuates itself into the excretory ducts of the lachrymal gland, forms a semilunar fold at the inner angle of the eyelids, covers the carnucula lachrymalis, invests the Meibomian follicles, enters into their apertures, and passes into the lachrymal canals by the puncta lachrymalia.

"This muco—cutaneous membrane is occasionally affected with inflammation, like that by which the other parts of the mucous system are commonly attacked, a puro-mucous, blenorrhæal, or catarrhal inflammation; and in other cases, it is affected with diseases evidently partaking of the nature of cutaneous eruptions. It thus resembles the membrane of the fauces, which sometimes is affected with catarrhal inflammation, and at other times with aphthœ; or the continuation of the lining membrane of the urethra over the glans penis, which in one case we see affected with gonorrhœ, and in another with a pustular eruption. There are certain marks by which we distinguish an inflammation of the conjunctiva from one of the sclerotica. The vessels of an inflamed conjunctiva are comparatively large, and tortuous; they are more of a scarlet colour, anastomose freely with one another, and form a net-work over the white of the eye; whereas the vessels of an inflamed sclerotica are small and hair-like, never very tortuous, but run like radii towards the cornea, forming thus a halo or zone, and not a net-work, and are generally more of a pink or rose, than of a scarlet colour. The vessels of an inflamed conjunctiva can be shoved, or drawn aside, by pressing or dragging the eyelids, and they shift under the rotary motions of the eyeball: whereas those of the sclerotica are not susceptible of any of these changes of place, but whatever position the eye assumes, maintain the same relation to the membrane on which they run, and to the cornea, although the conjunctiva is easily made to slide over them.

Here a question naturally occurs. Does the conjunctiva remain uninflamed in sclerotitis? We answer, No. Neither does the sclerotica in conjunctivitis." I am rather disposed to doubt this latter assertion; among the cases of conjunctivitis, which I have seen, I never could discover any peculiar pain or feature which would be likely to convey to the mind, that the sclerotica had participated in the inflammation. However in some cases of a vegement conjunctivitis, its probable that from a peculiar cachectic or leucophlegmatic habit of constitution, the sclerotica takes on the inflammatory action. "A common occurrence also conjunctivitis, and occasionally in sclerotitis, is an effusion into the cellular membranes connecting the two tunics, so that the conjunctiva is elevated from the sclerotica, which by this means is completely hid from view, so that in determining the genus of the ophthalmiæ, in this chemosed state of the eye, we must be led by other signs than merely the appearances or arrangement of the inflamed blood-vessels. We take into account the original seat of the inflammatory action, and consider which is the part the functions of which are principally affected. There is undoubtedly a sympathy of contiguity which prevents a conjunctivitis, or a sclerotitis, or an iritis, from existing entirely insulated, and without some participation of the surrounding parts, while at the same time it is evident that the inflammation begins in one part only, and continues through the whole course of the disease, to effect that part with much greater severity. We shall see immediately also, that there are certain subjective signs by which we can readily determine the genus of any ophthalmiæ, whether conjunctivitis or sclerotitis, even although we were not allowed to inspect the inflamed membrance at all."

PURO-MUCOUS CONJUNCTIVITIS IN GENERAL.

"There are certain symptoms characteristic of the genus conjunctivitis puro-muscosa, whether it arises from the influence of a cold and moist atmosphere, or from contagion, and whether the contagion be derived from this disease existing in the eye of another person, or from the application of puriform matter from other quarters, as that of leucorrhœa or gonorrhœa. All these are capable of exciting puro-mucous conjunctivitis, and the last mentioned causes to produce a much more severe disease than the first. The characteristic symptoms of puro-mucous conjunctivitis are analogous to those which attend the blenorrhœal or purulent inflammations of other mucous membranes in catarrh, or the lining of the urethra in gonorrhœa. Besides the primary phenomena of inflammation, there is a suppression of the natural mucous secretion of the inflamed conjunctiva, and a consequent feeling of dryness and itching in the eye; next follows a thin and irritating discharge; then a copious puriform discharge, which after continuing for a longer or shorter space of time in different instances, gradually diminishes, becomes thin, and at last ceases entirely, leaving the conjunctiva in a more or less altered state, and with a greater or less disposition to the re-secretion of pus.

"The most striking character of this genus is, no doubt, the puriform discharge. I need scarcely say that the pus is secreted by the conjunctiva: it is merely an increased and changed discharge of mucous, and not the effect of ulceration. It is almost superfluous to mention, that the inflammation of the conjunctiva, although peculiar, is still sufficiently distinct, and that we should form an erroneous idea of the diseases which I am now about to consider, were we to regard any of them as a mere flux of humours, and not as inflammatory affections.

"The pain in all the puro-mucous ophthalmiæ is distinctive and is compared by the patient to the feeling excited by sand in the eye.

Puro-mucous conjunctivitis as I have already mentioned, at length wears itself out, and subsides; but before this happens, the eye may be entirely destroyed, the cornea having grown opaque, or having become infiltrated with pus, ulcerated, and given way.

CATARRHAL OPHTHALMIA.*

Our author says, "There are three ophthalmiæ, which are frequently excited, especially in adults. by atmospheric influences; namely, the catarrhal, the rheumatic, and the catarrho-rheumatic. The first of these is a puro-mucous or blenorrhœal inflammation of the conjunctiva; the second is an affection of the fibrous sclerotica; while in the third, both the conjunctiva and sclerotica are attacked, and the symptoms of the catarrhal are united to those of the rheumatic ophthalmiæ.

"*Symptoms.*—"The inflammation in the catarrhal ophthalmia, which is by far the most common disease of the eye in adults, is almost entirely confined to the conjunctiva and Meibomian follicles. The mucous secretion of the membrane is increased in quantity, and occasionally becomes opaque, thick and puriform; but in many cases remains transparent, and by its superabundant quantity, renders the eye-lids merely more than usually moist and slippery, while the Meibomian secretion, also increased in quantity and chaffed by disease, concretes on the edges of the lids and amongst the eye-lashes, and binds them together during the night.

"In mild cases, the redness is chiefly in the conjunctiva lining the eye-lids; on the white of the eye, the vessels are arranged in a network; and can be moved in every direction, by pressing the eye-lid against the eye-ball with the finger, showing that they reside in the conjunctiva. Not unfrequently we observe spots of extravasated blood beneath the conjunctiva. In severe cases, chemosis takes place, even to a great extent; so much so, that if only general treatment be employed, as blood-letting and purging, while local means are neglected, the cornea may loose its vitality, become infiltrated with pus, burst and slough, and thus vision be destroyed. I have been led to attribute the distruction of the cornea in severe cases of catarrhal Ophthalmia, as also in the contagious or Egyptian Ophthalmia, and in the Ophthalmia of new born children, not entirely to a vital, but partly to a mechanical cause; not altogether to excessive inflammatory action in the cornea itself, but partly to the pressure caused by the enormous distended conjunctiva of the eye-lids and eye-balls: other causes, no doubt, concur in the puro-mucous inflammations of the conjunctiva, to produce opacities of the cornea, detachment of its conjunctival covering, and ulceration; and in particular, the maceration of the cornea in a flood of purulent fluid, not sedulously removed by injections. But the destruction of the cornea by infiltration of pus and sloughing, I am disposed to refer in no small degree to the pressure of the chemosed conjunctiva, and the consequent mechanical death of the cornea.

Diagnosis.—"In the catarrhal ophthalmia, the patient uniformly complains of a feeling of roughness of the eye, of sand, hot ashes, or broken glass under the upper eye-lid; a sensation which never attends the pure rheumatic ophthalmia, and may therefore be regarded as strickingly diagnostic. Moreover in the catarrhal ophthalmia, the patient is generally free from head-ach; whereas in the rheumatic, one of the most remarkable symptoms is supraorbital or circumorbital pain, severely aggravated during the night. When head-ach does attend the cartarrhal ophthalmia, it is seated across the forehead, and is felt most in the morning.

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* Conjunctivitis, Puro-Mucosa, Atmospherica.

Our author remarks that in the catarrhal ophthalmia the sensation of the presence of sand under the lids is so great, that he has been frequently requested and called upon to remove it.

Causes.—"Atmospheric changes, and especially exposure to cold and wet, are the exciting causes of this disease, night watching, and exposure to the night air after being much heated, &c." Individuals (says our author) who are attacked with this disease are very liable to a return of it. This ophthalmia has prevailed as an Epidemic disease, and has been called "*Epidemic ophthalmia.*" "In 1778" it proved very troublesome to some of the English camps, "when it was known by the name of the ocular disease." "In 1806 an Epidemic ophthalmia of this kind prevailed in Paris, and was in many instances attended by an affection of the mucous membrane of the air-passages." The same disease prevailed at Vienna, in Italy, in 1808, our authors considers this ophthalmia common to all seasons.

Prognosis.—Our author says, when this disease is badly treated, it will continue for weeks, and rouse in the system much febrile excitement "and constitutional illness, as well as local distress and danger. The palpebral conjunctiva becomes sarcomatous and rough, and by rubbing in this state against the cornea, brings on a vascular and nebulous state, or it may be even a dense white opacity, especially of the upper half of the cornea. The discharge from the conjunctiva is more apt, also, under neglect or improper treatment, to become puriform, and to assume the power of propagating the disease by contact.

Contagious.—Our author believes that this puriform discharge when applied to the eye of another person, brings about the same disease.

Treatment —Local applications are considered sufficient for the cure of this ophthalmia, he says, "that violent general remedies are absurd and worse than useless; and that a local stimulent treatment may almost be entirely relied on, and that he was first struck with the truth of this fact in the successful management of this disease by Professer Beer, at Vienna, 1817." I have met with cases of the above ophthalmia in athletic subjects, had I trusted solely to local applications they would have had a disorganization of the cornea or a high state of chemotic inflammation induced. I make it a common practice when called upon to prescribe in cases of catarrhal ophthalmia, as it is termed by our author to deplete from the arm followed by stimulant collyria.

1. Our author disapproves of depletion either from the arm or with leeches, but if much constitutional irritation is manifest, twelve or twenty ounces are to be taken from the arm.

2. If a degree of chemosis, with purulent discharge, scarification is considered as a valuable means of cure.

3. Purges of calomel and jalap, followed by neutral salts.

4. "Determimics to the skin is also useful. This may be done by the warm pedeluvium at bed time, and by small doses of spiritus Mindereri, or any other mild diaphoretic in combination with diluent drinks."

5. Blistering the nape of the neck, and behind the ears in inveterate cases.

6. The collyrias of the acetate of lead and sulphrate of zince are disapproved of. "Aggravates the inflammation, increasing the sensation as if sand were in the eye, favoring the formation of ulcers on the cornea, or if ulcers be already present, leading to opaque cacatrices."

7. The lunar caustic solution is preferred. "The solution which I employ contains from two to four grains of the nitrate of silver in one ounce of distilled water. A large drop is to be applied to the eye once a-day, by means of a camel's hair pencil. The instant that it touches the eye, the salt is decomposed, and the silver precipitated over the conjunctiva in the state of muriate. I have sometimes alarmed other practitioners, by proposing to drop upon the surface of an eye highly vascular, affected with a feeling as if broken pieces of glass were rolling under the eyelids, and evidently secreting purulent matter, a solution of

lunar caustic; and I have been not a little pleased and amused at their surprise, when, next day, they have found all the symptoms much abated by the use of this application."

"8. A collyrium of one grain of corrosive sublimate in eight ounces of water. "This being made milk-warm, is to be used thrice a day, for fomenting the eyelids, by means of a linen rag. In mild cases, a few drops are then allowed to flow in upon the eye; but in severe cases, in which the discharge is copious and puriform, this collyrium must be injected over the whole surface of the conjunctiva, and especially into the upper fold of that membrane, by means of a syringe, so that the whole morbid secretion may be removed, and the diseased membrane touched immediately by the solution."

"9. Smearing upon the edges of the lids precipitate ointment, a small quantity, before going to bed, to prevent a concretion of them.

"10. Upon examining the inside of the lids, which is to be done daily, and if any sacomatous state of the conjunctiva or roughness is manifest, it should be leeched or scarified, and touched with the solid sulphate of copper, or nitrate of silver. Our author says he has met with the greatest success in the above treatment of this ophthalmia.

"*Modified by Struma.* The catarrhal ophthalmia occurring in strumous habits, and especially in children of that constitution, is very liable to degenerate into the phlyctenular ophthalmia, hereafter to be described. The strumo-catarrhal is one of the compound ophthalmiæ, which are apt to prove troublesome to the inexperienced practitioner."

CONTAGIOUS OPHTHALMIA.*

Individuals residing in warm climates are prone to this disease, as in Egypt, Persia and India. It made its appearance in Europe, having been brought thither by the British troops from Egypt in 1800, 1801 and 1802. It commonly goes by the name of the Egyptian ophthalmia.

Symptoms. "These succeed each other with different degrees of rapidity, and present very different degrees of severity, in different individuals, who are suffering at the same time, in the same place, and from the same infection. These differences depend on the constitution of the patients, on their state of health when they become affected, and upon incidental and minute circumstances of situation. In women, for instance, the disease is said to be milder than in men. It has also been remarked, that, as the age is near to puberty, on either side, the disease is, in general, more fatal in its effects. In scrofulous persons, it is always tedious, and more likely to destroy the eye.

"The purely inflammatory stage of this disease, though often shorter in its duration, appears never to surpass thirty hours. At the end of that time, purulent matter is always formed by some portion of the conjunctiva.

"This disease often appears immediately after the application of the contagious or infectious matter to the conjunctiva, and in some cases the inflammation will terminate in the formation of pus before the patient scarcely feels the inflammatory stage." The right eye is more commonly attacked by this disease than the left.

The following is the order in which the symptoms arise:

"A considerable degree of itching is felt in the evening, or suddenly there arises in the eye the feeling as if a particle of dust were between the lids and the eyeball. This is succeeded by a sticking together of the lids, principally complained of by the patient on awaking in the morning. The eyelids appear fuller externally than they ought to do. Their internal surface is inflamed, being tumified and highly vascular; and the semilunar membrane and carruncula lachrymalis considerably enlarged, and redder than usual. The swelling of hese parts is soft, somewhat elastic, slippery, and easily excited to bleed.

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* Conjunctivitis Paro-mucosa contagiosa, vel Egyptiaco, ophthalmo blenorrhœa. Purulent-ophthalmia.

"We have here all the symptoms of the purely inflammatory stage, and even the symptoms of commencing suppuration. In the course of a few hours, a thin, acrid secretion takes place from the conjunctiva. This gives the slipperyness to the external surface of the eyelids, and the Meibomian secretion being now increased above its usual quantity concretes among the eyelashes, and causes the eyelids to adhere during sleep. The sensation of sand in the eye is owing merely to the dilated state of the conjunctival vessels.

"In about twenty-four hours after the first symptoms make their appearance, the mucous discharge from the internal surface of each eyelid is considerable in quantity. It is still thin, but somewhat viscid, and begins to be opaque. It lodges at the internal angle of the eye. On everting the lids, their internal surface is observed to be much more vascular and tumid. There is also epiphora present, especially when the patient exposes his eye to a current of air. He complains of a sensation as if the eyes were full of sand, but seems to experience but little uneasiness from the light. Not unfrequently a considerable discharge of blood takes place from the conjunctiva, after which the swelling of the membrane diminishes for a time.

"The inflammatory action extending now to the whole internal surface of the eye-lids, the secretion from the palpebral conjunctiva is much augmented, and becomes more distinctly puriform, being yellowish and thick. In many cases, it is so abundant, that, on the patient opening his eyes, the matter instantly flows over the cheeks. It irritates the skin, and even excoriates it. The swelling of the conjunctiva of the lids, and especially of the upper, increases with the discharge; partly from a serious effusion immediately under the membrane, partly from an unnatural and inflammatory development of its vascular structure, partly from a similar enlargement of its mucous cryptæ, and of the Meibomian follicles, giving rise to a sarcomatous appearance of the internal surface of the eyelids.

"The disease may not proceed farther over the conjuctiva, but remain in the state described for weeks, or even months; and, however severe it may appear to another person, give but little uneasiness to the patient. The purulent secretion may then diminish, and recovery gradually take place. In other cases, the inflammation spreads rapidly to the conjunctiva of the eye-ball. Its vessels are distended with red blood, forming a thick net-work over the sclerotica, interspersed, in some instances, with small spots, from extravasation. The membrane itself becomes speedily thickened, and a serous effusion taking place into the cellular membrane, which connects it to the sclerotica, it is raised, so as to form a pale red and soft elevation, or chemosis. In some cases, this inflammatory œdema exists only at particular spots, though the vascularity of the conjunctiva is considerable, and extends even to the cornea. It commonly happens that the chemosis gradually spreads from the lids over the surface of the eye towards the cornea, with its advancing edge accurately defined, leaving for a while a circle round the cornea, which is gradually intruded on by the swelling, till closely surrounded, and at last completely buried and overlapped; scarcely can even its centre be perceived. This chemosis is sometimes so great, that the conjunctiva of the eyeball protrudes considerably from between the lids."

The chemosis is soon accompanied or conjoined with much swelling of the cuticle of the palpebra, and with vascular appearance. In some cases, they become enormously swelled in a few hours; in others, not for some days. It sometimes happens that this swelling of the lids is preceded by a slight eversion, or inversion of the upper or lower lids.

The inflammatory action revelling in the sclerotic conjunctiva, the flow of puriform fluid is much augmented Dr. Vetch states that it exceeds several ounces in the day. Mr. Mackenzie says this puriform fluid "partly escapes from between the lids, partly lodges in their folds, and in the pit formed over the cornea by the chemosed conjunctiva. In this last situation the purulent discharge is sometimes allowed, from carelessness, to remain so long, that it assumes the appearance of a thick membrane, so that one unacquainted with the symptoms, on seeing this piece of matter drop from the eye, is apt to suppose that the whole organ is destroyed, and that it is the cornea itself, in the state of a slough which has separated.

"The puriform secretion may continue without much change for twelve or fourteen days, or even a longer period. The swollen conjunctiva of the eye-ball, in the mean time, becomes sarcomatous, but never to the same extent as that of the lids. At length the chemosis begins to shrink, and the fluid secreted to diminish in quantity, and gradually to lose the characters of pus, becoming thin and gleety. The internal surface of the eye-lids, the semilunar membrane, and caruncle lachrymalis, which were the parts first affected, are the last in which the disease disappears. Not unfrequently, the internal surface of the lids remains in a sarcomatous state, seemingly from the morbid state of the mucous-cryptæ of the conjunctiva, and of the Meibomian follicles. These, instead of subsiding to their natural size, become indurated, and form a granular, scabrous, or mulberry surface, which constantly rubbing against the cornea, keep up a chronic inflammation in its investing membrane, which becomes covered with red vessels, and loses, in a great degree, its transparency.

"Such may be looked upon as a favorable case of this disease. We must be prepared to meet more destructive termininations af it.

"In some cases the primary inflammation extends to the layer of conjunctiva which covers the cornea. That layer becomes thickened, detached in some measure from the cornea, and more or less opaque. The patient's vision is much diminished by these changes: and very frequently the opacity and consequent diminution of the vision continue after all the acute symptoms of the disease have disappeared. Superficial ulceration frequently attacks the cornea in the course of this disease, giving rise to opaque cicatrices of various sizes and often producing a partial flatness, or the cornea irregular on its surface, and permanently unfit for distinct vision. Even when the ulceration has not penetrated through the cornea, the iris sometimes advances and adheres io its internal surface, opposite to the ulcerated part.

"In other cases, the inflammatory process is still more severe, attacking the whole substance of the cornea, and even extending to the internal textures of the eye. The patient is now subject to deep-seated pulsative pain in the eye, coming on sometimes in paroxysms, in other instances continuing with scarcely any remission in its violence, till the cornea gives way. The varieties, indeed, in regard to the pain, are exceedingly remarkable, depending, no doubt, in a considerable measure, on the part which the several textures of the eye take in the disease. For the most part, the attacks of pain are sudden. Occasionally they are preceded by chillness and slight nausea, or by a peculiar sensation about the head. Frequently the pain, with a remarkable increase of heat, occurs around the orbit, in a degree no less excruciating than in the eye itself. The space over the frontal sinuses, the temples, and the face, are its frequent seats, or to speak more correctly, it affects the branches of the fifth pair of nerves distributed to these parts. Sometimes it occurs immediately above the eye, commencing about the supra-orbitary foramen. This supra-orbital, or circum-orbital pain is indicative of the inflammation extending to the sclerotica; choroid, cornea and iris. Inflammation of these textures always excites sympathetic pain in the fifth pair of nerves. The pain round the eye is aggravated by pressure, and occasionally a circumscribed swelling suddenly takes place over the part affected. When such a swelling appears in the face, it partakes of an œdematous nature, and equally sudden in its accession, does not subside so rapidly during an intermission, as the swellings which rise under the same circumstances on the forehead and temple. At all times, the eye is the most frequent seat of the pain. It is described to be in the eye of a darting or shooting kind. Sometimes it is compared by the patient to what might be felt if the eyes were stuck of full of needles. During the pain. the secretion of tears is more copious, and the purulent discharge, on the contrary, almost uniformly diminished.

"It has been remarked by Vetch, that, in the frequent recurrence of the paroxysm of pain, ruptures of the cornea occur; however, they most generally take place at the acme of the disease."

The iris is forced forwards through these apertures in the cornea; adhesions take place between this membrane and the cornea, producing staphyloma. "In some cases the iris, after the eye recovers, remains protruding at different points, scarcely covered by any pseudo-cornea, but presenting a number of dark-coloured prominences, like the grains of a mulberry, a state of the cornea and iris which is styled staphyloma racemosum."

Other more dreadful conditions of the eye may ensue as stated by authors, such as sloughing out of the eye-ball, or the patient may sink from the violence of the disease.

Causes.—Propagation of the disease from person to person. "I have already explained my views regarding the propagative power assumed by the common catarrhal conjunctivitis of this country; and I have hinted that propably the ophthalmia which arose in the British and French armies in Egypt, and with which they returned to Europe, had a similar origin. Assalini attributes the disease, as it occurred among the French, to the vivid light and excessive heat of the country, as predisposing causes, and suppressed perspiration as the occasional cause; or, in other words, considers it as a catarrhal ophthalmia. This inflammation of the conjunctiva, arising where or how it may, appears speedily to acquire, if it does not from the first possess, the power of producing by contagion, a disease similar in nature to itself, but much more severe."

This ophthalmia was very prevalent among the Egyptians at one time, and still continues to prove a source of much annoyance to them.

For the cure of this disease, blood-letting, both general and local, purgatives, emetics, emetic tartar combined with glauber or epsom salts, diaphoretics, Dover's powder, with warm pediluviums on going to bed· Alteratives—calomel and opium, quinine, and other tonics.

Astringents.—The nitrate of silver has the superiority—two or four grains to the ounce of water. Counter-irritants, the red precipitate or citron ointments, smeared upon the tarsus on going to bed, prevents the sticking together of the lids. Evacuating the aqueous humor has been recommended. Mr. Wardrop, as was stated, values highly this course of treatment.

Opiate fomentations and friction. "Much benefit is obtained in any kind of ophthalmia, by permitting the steam of hot water, with laudanum, to rise into the eye, or bathing the eye in a warm decoction of poppy-heads.

Vinum Opii.—"When the purulent discharge is gone, this proves an excellent application to the relaxed conjunctiva"

In evacuating the aqueous humour, it has been advised to use the iris-knife, the incision to be made in the cornea.

Change of residence, proper food, cold or warm bathing, are considered as beneficial after an attack of this ophthalmia.

I have not quoted all of our author's description of this ophthalmia, because it is a disease, I believe, of rare occurrence in the United States.

OPHTHALMIA OF NEW-BORN CHILDREN.

"Infants, soon after birth, are subject to a puro-mucous inflammation of the conjunctiva. commonly denominated *ophthalmia neonatorum*, or the *purulent ophthalmia of infants.* We have reason to believe that this disease is, in general, an inoculation of the conjunctiva by leucorrhœal fluid, during parturition; and that, therefore, it may be prevented, in almost all cases, by carefully washing the eyes of the infant with tepid water, as soon as it is removed from the mother. This is too seldom attended to; the child is allowed to open its eyes, the nurse sitting down with it on a low seat before the fire, or in a draught of cold air from the door, and nothing is done to the child for perhaps half an hour, or longer. Exposure to the light, to the heat of the fire, or to the cold draught from the door, are all likely enough injuriously to excite the eyes of the new-born infant; and, accordingly, some have been led to attribute the purulent ophthalmia which so frequently shows itself about the third day after birth, to these causes. It will, in general, be found, however, that when the child becomes affected with this ophthalmia, the mother has had leucorrhœa before and at parturition, and that the eyes have not been cleaned for some time after birth. To this the ophthalmia seems to be owing, for, like a disease communicated by contagion, it is sudden in its attack, and much more violent than we almost ever see catarrhal ophthalmia, so that it resembles in this respect the Egyptian, or the gonorrhœal inflammation of the conjunctiva. That some of the cases of purulent ophthalmia, in infants, are catarrhal, is by no means unlikely; occasionally they may arise from the application even of gonorrhœal matter from the mother; but by far the greater number I believe to be the consequences of leucorrhœal inoculation."

I believe the remote, or predisposing cause of this ophthalmia in some cases, may be found in the maternal system, consisting in a depraved or acrid quality of the liquor amnii, some scrofulous or scorbutic diathesis; for *ophthalmia neonatorum,* as it is denominated, has made its appearance, where the strictest attention was paid to cleansing the body and eyes of the infant—when caution was taken to keep it from currents of cold air, or strong fires, and, in fact, when no leucorrhœa was present. It seems simply, then, in these cases, the conjunctiva being exposed to the atmosphere, excites into action the ophthalmia under consideration.

"*Symptoms*.—It is commonly on the morning of the third day after birth, that the eye-lids of the infant are observed to be glued together by concrete purulent matter. On opening them, a drop of thick white fluid is discharged, and on examining the inside of the lids, they are found extremely vascular and considerably swollen. If neglected, as this disease but too often is, or treated with some such useless application as a little of the mother's milk, the swelling of the conjunctiva goes on rapidly to increase, the purulent discharge becomes very copious, and the skin of the lids assumes a dark red colour. In this state the eyes may continue for eight days, or a few days longer, without any affection of the transparent parts, except, perhaps, slight haziness of the cornea. About the twelfth day, however, the cornea is apt to become infiltrated with pus, its texture is speedily destroyed, it gives way by ulceration, first of all exteriorly to the pus effused between its lamellæ, and then through its whole thickness, and this either in a small spot only, or over almost its whole extent, so that sometimes we find only a small penetrating ulcer, with the iris pressing through it; in other cases the whole cornea gone, and the humors protruding.

"It is melancholy to reflect on the frequency of destroyed vision from this disease, especially as the complaint is completely within control, if properly treated. The attendants unfortunately are not alarmed sufficiently early, by what they consider as merely a matter running from the eye; and but too often it happens that medical practitioners are also betrayed into the false supposition, that there is nothing dangerous in the complaint, till the cornea burst, and the eyes are for ever destroyed. Many children have been brought to me in this state; but the most deplorable instance which I have witnessed of the effects of this disease, when neglected or mistreated, was that of two twin infants, from Perthshire, for whom I was consulted, some time ago. One of the children had lost the sight of both eyes totally, while the other retained a very partial vision with one eye.

"That this disease is a puro-mucous or blennorrhœal conjunctivitis, is sufficiently evident. It is scarcely necessary to spend time in refuting Mr. Saunders' notion of its being an erysipelatous inflammation. His opinion regarding the mode in which the cornea is destroyed in this disease, appears of more importance, and equally incorrect. He maintains that it is by sloughing, not by suppuration and ulceration, that the destruction of the cornea is effected. The opportunities which I have had of watching the progress of the affection of the cornea, have convinced me of the contrary. Onyx, or infiltration of pus between the lamellæ of the cornea is the uniform harbinger of destruction; the lamellæ exterior to the pus give way by ulceration; the ulcer spreads and deepens, till the cornea is penetrated, and often almost altogether destroyed. Any thing like mortification, or sloughing, I have never seen. The coming away of the purulent infiltration, exposed by ulceration, must have given rise to Mr. Saunders' notion of successive sloughs.

"Infants labouring under this ophthalmia are fretful and uneasy, and rest ill during the night. The tongue is white, and bowels deranged. If the disease is neglected, the flesh wastes away, and the integuments become loose and ill-coloured.

"*Prognosis.* When a child is brought to us with this disease, our first business is carefully to clean and examine the eyes, explaining to the nurse the manner in which she is to remove the purulent discharge from time to time, and stating plainly what is likely to be the result of the morbid changes already present in the cornea. If these important parts are only free from ulceration, and from purulent infiltration, however violent the inflammation may be and profuse the discharge, our prognosis may be favourable—the sight is safe. If there is superficial ulceration, without onyx, probably a slight speck may remain. If the ulceration is deep, an indelible opacity must be the consequence. If the iris is protruding through a small penetrating ulcer, the pupil will be permanently disfigured, and vision more or less impeded. If the ulcer is directly over the pupil, the probability is that the pupillary edge of the iris will adhere to the cicatrice, and vision be lost, until a lateral pupil be formed in after-life by an operation. If there is a considerable onyx, we can promise nothing; for, although under proper treatment, the matter may be absorbed, this is by no means a certain result; the purulent exudation may, on the contrary, increase, the cornea burst, and the eye become partially, or totally staphylomatous. Whenever the person who brings the child to me announces that the disease has continued for three weeks, I open the lids of the infant with the fearful presentiment that vision is lost, and but too often I find one or both of the corneæ gone, and the iris and humours protruding. In this case, it is our painful duty to say that there is no hope of sight.

"*Treatment.* 1. As it is of the utmost importance to remove the purulent discharge, from time to time, in the course of the day, I may, perhaps, be excused for explaining minutely how the eyes are to be cleaned. The surgeon lays a towel over his knees, on which to receive the head of the child, whom the nurse, sitting before him, lays across her lap. The fluid for washing the eyes is the tepid solution of one grain of corrosive sublimate in eight ounces of water. The lids are opened gently, and, with a small bit of sponge, the purulent discharge is removed. The lower lid, and then the upper, are next everted, and wiped clean with the sponge. The upper lid has a tendency to remain everted, especially if the child cries. This is overcome by pushing the swoln conjunctiva into its place, and bringing down the edge of the lid. All this ought to be repeated three or four times, or oftener, in the twenty-four hours, by the nurse.

"2. The corrosive sublimate collyrium, used in cleaning the eyes, tends gently to repress the discharge. Alone, however, it is not sufficient for that purpose, and we have recourse, therefore, to astringent applications of more power. The solutions of nitras argenti and sulphas cupri are those which I have found most useful. Once, or at most twice a day, I apply, with a large camel's hair pencil, the solution of four grains of the former, or six of the latter, in an ounce of distilled water, to the whole surface of the inflamed conjunctiva, immediately after having cleaned it, as above described. Not only the local, but even the constitutional good effects of removing and restraining the purulent discharge are very remarkable. The first night after the use of the collyrium and drops, we generally find that the infant has been much quieter than it had been when the disease was neglected.

"3. To prevent the eye-lids from adhering during the night, the red precipitate ointment is to be applied along their edges at bed-time.

"4. The above remedies are perfectly sufficient to remove this disease, if had recourse to within two or three days after the first symptoms have shown themselves. I have seen two applications of the nitras argenti solution, viz. on the third and fourth days after birth, or first and second days of the disease's showing itself, remove the complaint completely, although thick white matter had been secreted by the conjunctiva. In cases attended by a discharge less distinctly puriform, the use of the red precipitate salve at bed-time, has sometimes been sufficient. In cases, again, which have been neglected for perhaps eight or ten days, it is necessary to take away blood from the inflamed conjunctiva by scarification, or from the external surface of the upper eye-lid by the application of a leech. The latter may be had recourse to in the first instance, and unless followed by marked abatement of the redness and swelling on the inside of the lids, the conjunctiva may next day be divided with the lancet. The taking away of blood in either of these ways is productive of much benefit, and ought by no means to be omitted, if there be any tendency to chemosis, or any threatening of haziness of the cornea. A more profuse loss of blood than can be obtained by the methods here recommended, I do not consider necessary.

"5. A remedy of great service in this disease, is the application of blisters behind the ears, or to the back of the head. Cantharides plaster spread on a bit of candle-wick, and laid between the head and the external ear, is a convenient mode of breaking the skin; and by continuing this application either constantly, or several hours daily, a continued discharge will be procured. As soon as there is a discharge of matter from the blistered parts, we find an amendment in the affection of the eyes; but if the ears are allowed to get well, we often observe a renewal of the inflammation of the conjunctiva, and a more copious flow of puriform matter, which again subside, if the blisters are reapplied.

"6. An occasional dose of castor oil will be found useful.

"7. Recovery from this disease is often tedious. For weeks, we continue the treatment above recommended, and although there is no change for the worse, nor any affection of the cornea, and perhaps but little purulent discharge, still the conjunctiva continues inflamed, and the symptoms, on the whole, stationary. Under these circumstances, I have found small doses of calomel highly useful. From a quarter to half a grain daily, will be sufficient.

"8. In threatened disorganization of the cornea, Mr. Saunders has strongly recommended the extract of cinchona. The sulphate of quina will probably answer better, and be more easily administered. Half a grain may be given twice or thrice daily.

"9. The relaxed conjunctiva, after the purulent discharge has entirely subsided, may be advantageously touched once a day with vinum opii, in place of metallic solutions. I have sometimes treated cases with the vinum opii throughout, but I consider this remedy as more applicable for the chronic stage of the complaint than for the acute.

GONORRHŒAL OPHTHALMIA.

"Different views have been entertained of the purulent inflammation of the conjunctiva, which is frequently found to attend, or succeed to gonorrhœa. 1st, This ophthalmia has been ascribed to inoculation with matter from the urethra; 2dly, It has been supposed to be metastatic; and 3dly, It has been considered to be, at least in certain cases, an effect owing to irritation merely, without either inoculation or metastasis. It is quite possible that there may be three varieties of this ophthalmia, one from contagion, a second from suppression, and a third from irritation. The existence of the first I consider to be beyond all doubt; that of the second and third is somewhat problematical.

"Some, while they have admitted that facts have fully demonstrated that this disease occasionally owes its origin to inoculation, have expressed their surprise that it is not more frequently produced in this way, considering how common gonorrhœa is, and how careless many of those of the lower ranks are of cleanliness. We should expect, say they, the finger to be in many more cases the conveyer of the matter of the gonorrhœa to the conjunctiva, than it actually appears to be. The instinctive closure of the eye-lids when the finger approaches the eye, making it actually difficult for a person to touch his own conjunctiva, unless with one finger he draws down the lower lid, and attempts to touch his eye with another finger, will serve in some measure to explain the rarity of this kind of inoculation.

"Women are much less frequently the subjects of gonorrhœal ophthalmia than men.

"In general, it is only one eye which is affected with this disease, especially when it arises from inoculation.

1. *Gonorrhoeal Ophthalmia from Inoculation.*

"*Case* 1. A patient was brought to me some time ago from the country, by a gentleman under whose care he was, and who had formerly been one of my pupils, with his left eye violently inflamed and chemosed, the chemosis of a pale red colour, the conjunctiva discharging a large quantity of purulent fluid, the lower lid greatly everted, and the cornea, from lymph, and probably pus effused between its lamellæ, totally opaque. This patient was affected with gonorrhœa, and thirteen days before I saw him, while engaged in removing the discharge from the urethra, a drop of the gonorrhœal fluid was, by mischance, thrown fairly in upon his left eye, and excited the severe puro-mucous ophthalmia under which he was labouring. The gonorrhœa still continued when I saw him. The inflammation of the eye subsided under appropriate means, the cornea cleared to a degree far beyond my expectations, and a considerable share of vision was preserved. The right eye was not at all affected.

"*Case* 2. Mr. Allan relates the following interesting case of contagious gonorrhœal ophthalmia. 'I was consulted,' says he, 'by a young gentleman of 17 years of age, on account of a gonorrhœa recently contracted, but by no means severe. In a few days after his application to me, the eyes became violently and suddenly inflamed, the eye-lids much tumefied, and there took place a profuse discharge, similar to that of gonorrhœa, excoriating the cheeks, and accompanied by great pain, considerable fever, and general restlessness; the discharge from the urethra did not at once disappear, notwithstanding the violence of the ophthalmia. In a few days, his younger brother, a boy 14 years of age, who never had been exposed to any venereal complaint contracted by sexual intercourse, and who slept in the same room, was similarly affected; and the disease in both eyes was equally severe as in those of the elder brother. I called Dr. Monro and Mr. J. Bell into attendance; but notwithstanding every means that could be devised, the elder brother lost the sight of both his eyes, and the younger brother of one eye. If it be said," adds Mr. Allan, "that in the elder brother the ophthalmia might arise from a consentaneous connexion or sympathy betwixt the urethra and the conjunctiva, and not from the direct application of the virus, still this explanation will not at all apply to the younger brother, who had no gonorrhœa, but who must have contracted the disease from actual contact; as by using the same towel or wash-hand basin with his brothor, wiping his face with the same handkerchief, or in some less obvious manner, and in whom it is equally severe."*

"*Case* 3. Astruc relates, that a young man had been in the habit of every morning bathing his eyes with his urine while it was yet warm, in order to strengthen his sight. Although he had contracted a gonorrhœa, he did not abstain from this custom, apprehending no harm from it; but the urine partaking of the infectious matter, quickly communicated the same disease to the tunica conjunctiva of the eye and eye lids. The consequence was a severe ophthalmia, attended with an acrid and involuntary discharge of tears and purulent matter, but which yielded to the same remedies which removed the gonorrhœa.†

"*Case* 4. A healthy young woman happened to wash her eyes with some sugar of lead water, and a sponge which had previously been used by a young man affected with gonorrhœa; the consequence was that she immediately contracted a severe ophthalmia, which rapidly destroyed one eye, and brought on a swelling of the lymphatic glands about the neck, for which she underwent a course of mercury.‡

"So similar is the discharge from the eye in gonorrhœal and in Egyptian ophthalmia, to that which runs from the urethra in gonorrhœa, that some have gone the length of concluding that gonorrhœa has been originally an inoculation of the urethra by the matter coming from the eye in Egyptian ophthalmia, while others are of opinion that this last disease is nothing else than the effects of an inoculation of the conjunctiva with matter from the urethra in gonorrhœa. Both parties have referred to experiments in favour of their own opinion. Little can be drawn from negative experiments on this subject. It is demonstrated beyond all doubt that the matter from the urethra in gonorrhœa, applied to the conjunctiva, excites a severe puro-mucous ophthalmia, and a similar inflammation of the urethra has unquestionably been brought on by inoculation with the matter coming from the conjunctiva in the Egyptian ophthalmia; but experiments of this kind have also sometimes failed, and from such failures conclusions have been drawn that are altogether unwarrantable. For example, Dr. Vetch tells us that in the case of a soldier, received in a very advanced stage of the Egyptian ophthalmia, he attempted to divert the disease from the eyes to the urethra, by applying some of the matter taken from the eyes to the orifice of the urethra. No effect followed this trial. It was repeated in some other patients, all labouring under the most virulent state of the Egyptian disease; and in all, the application was perfectly innocuous. But, in another case, where the matter was taken from the eye of one man, labouring under purulent ophthalmia, and applied to the urethra of another, the purulent inflammation commenced in thirty-six hours afterwards, and became a very severe attack of gonorrhœa. From the result of these experiments, Dr. Vetch, while he admits that gonorrhœal matter taken from one person and applied to the conjunctiva of another, will excite a highly purulent ophthalmia, regards himself justified in no longer admitting the possibility of infection being conveyed to the eyes from the gonorrhœal discharge of the same person. He adds that the impossibility of this effect was rendered decisive by an hospital-assistant, who, with more faith than prudence, conveyed the matter of a gonorrhœa to his eyes, without any affection of the conjunctiva being the consequence.* It is remarkable, that Dr. Guillie has fallen into the same error of reasoning with Dr. Vetch, only that his negative experiments have led him to the very opposite conclusion. He applied the matter taken from the conjunctiva of one patient to the urethra of another; no effect followed, and hence he concludes that the notion of some, regarding the propagation of puro-mucous inflammation from one mucous membrane to another in different individuals, is unfounded.†

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* System of Pathological and Operative Surgery, vol. i. p. 153. Edin. 1819.

† De Morbis Venereis, p. 192. Lutetiæ Parisiorum, 1736.

‡ Chirurgie Clinique de Montpellier, par le Professeur Delpech. Tome i. p. 318. Montpellier, 1823.

"The first case which I have related would have been sufficiently convincing to me of the reality of gonorrhœal ophthalmia by inoculation had I entertained any doubt upon the subject. The man had a profuse gonorrhœa, but his eyes were perfectly well; shaking away the discharge from the penis, and stooping at the time, a drop went fairly in on the left eye, violent inflammation immediately set in, was all along confined to the eye which had been inoculated, and produced the results already stated, while the gonorrhœa continued to run its course.

"*Diagnosis.* There are no marks which can be absolutely depended on, by which to distinguish gonorrhœal ophthalmia, produced by inoculation, from the Egyptian, or contagious ophthalmia. The symptoms of the former are not less rapid and severe than those of the latter; and the danger of losing the eye, by destruction of the cornea, greater perphaps than in any other ophthalmia There is a great degree of chemosis, and a profuse discharge of matter, varying in colour like the discharge in gonorrhœa. The external surface of the lids is perhaps not so much swoln, nor of so dark and red a colour, as in the Egyptian ophthalmiæ. In the early stage, it will also be observed, that in the latter disease, the inflammation commences on the inside of the lids; whereas in gonorrhœal ophthalmia, it attacks the whole conjunctiva at once. The history of the two diseases will perhaps afford the best ground for diagnosis.

"*Treatment.* This ought to be exactly the same as in the Egyptian ophthalmia. Abstinence from all stimulants; blood-letting, both general and local, and the exhibition of purgatives, or emeto purgatives, and diaphoretics, are to be had recourse to in the early stage. The discharge is to be frequently and carefully removed with the muriate of mercury collyrium, the conjunctiva is to be touched once or twice a day with the nitras argenti solution, and the lids are to be prevented from adhering by the use of the red precipitate salve. Counter-irritation ought to be employed from the very first, by means of sinapisms and blisters to the neck, between the shoulders, or behind the ears. If either the pain of the eye is pulsative, or the circum-orbital region affected with nocturnal paroxysms of pain calomel and and opium are to be given, till the mouth is sore. Warm fomentations, the vapor of laudanum, opiate friction of the head, and the like, will serve to moderate the pain; but our chief reliance must be placed on depletion, counter-irritation, scarification, and smarting applications to the conjunctiva, for removing the disease. Snipping out a portion of the chemosed membrane, so as to procure a considerable flow of blood, is highly serviceable.

"Bleeding alone must not be depended on. 'The inflammation produced,' says Mr. Bacot, 'in the four instances that have come under my observation. is of the most violent and intractable description, and has produced the total destruction of the organ of vision, in the space of two or three days, notwithstanding the most vigorous employment of general and topical blood-letting, and other antiphlogistic means.'*

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* Practical Treatise on the Diseases of the Eye, p. 242. London, 1820.

† Bibliotheque Ophtalmologique. Tome, i. p, 83. Paris, 1820.

"The acetate of lead and the sulphates of zinc and copper, at least in the early stage, will be found to aggravate the symptoms. These are the local remedies recommended by Mr. Allan; and the case already quoted, the publication of which does great credit to his candour, shows how little adapted these applications are to this disease.

2. *Gonorrhœal Ophthalmia from Metastasis.*

"The doctrine of *related diseases*, or of the *conversion* of one disease into another, is at once one of the most important and difficult, in the whole science of medicine.

"Perhaps the most familiar example of a metastasis, or conversion of disease, is swelled testicle following suppressed gonorrhœa; but no one supposes that in this case, there is actually a translation of matter from the urethra into the testicle.

"The most dangerous, as well as the best proven translation, is that which attends the inflammation of veins. For instance, caustic potass was directed to be applied on the outer side of the leg, below the knee, for the purpose of forming an issue. By mischance, it was applied over one of the branches of the external saphena. The eschar fell out, and was found to have penetrated into the vein, which immediately bled profusely. A bit of sponge was applied, and kept in its place by a roller. The vein inflamed, violent fever ensued, and the patient died. Before his death, a considerable swelling, communicating to the hand a peculiar kind of crepitation, had formed under one of the pectorales majores. On dissection, this swelling was found to consist of a large collection of pus. Within the veins, purulent matter was traced from the external saphena to the commencement of the inferior vena cava. The explanation which has generally been adopted of metastatic cases like this, is that the pus, mingling with the blood, is circulated through the body, and by its presence, excites inflammation in parts remote from the seat of the original injury. In various parts of the body, and among others in the eye, inflammation, ending in suppuration, and sometimes in ulceration, has been known to arise from inflamed veins. A highly interesting case of this kind occurred to Mr. Earle. He had removed a portion of a varicose vein of the leg. This was followed by great constitutional disturbance, inflammation of the vein, deep-seated abscesses in the opposite leg, in both forearms, and in one of the lungs. The day before the patient's death, the corneæ were observed to have become opaque, and their surface rough; the vessels of the conjunctiva were injected, and the patient lay with his eyes constantly closed. On dissection, destructive changes were found to have taken place within the globe of the right eye, the crystalline lens was so soft as to yield to the slightest touch, the vitreous humour was of a reddish yellow colour, and red vessels were distinctly seen traversing its membrane. The retina was of a deep red colour. The nerve of the third pair on the left side was evidently flattened, and softer than that on the right. The nerve of the fifth pair on the right side had undergone a similar change to a greater extent.† This, then, appears to have been a destructive inflammation of the eye, arising from the transmission of pus into the circulation.

"A similar case is recorded by Mr. Arnott, in his valuable paper on the Secondary Effects of Inflammation of the Veins, published in the fifteenth volume of the Medico-Chirurgical Transactions. A young man had a ligature placed on the left carotid artery, for an aneurismal disease of one of its branches. Considerable difficulty was experienced in passing the needle round the vessel. Venous hæmorrhage took place during the operation, recurred at night, and occasionally afterwards, for nine or ten days. On the fifth day after the operation, the patient had a severe rigor, succeeded by heat of skin, and general febrile symptoms. These increased, the pulse rose to 120, and the constitutional disturbance assumed a very violent character. About the tenth day, the vision of the left eye became impaired, and was quickly lost, the pupil was contracted, the iris immovable. and the cornea had a somewhat hazy appearance; effusion took place under the conjunctiva, and the lids were greatly swoln, producing an appearance as if the globes were much protruded. There was, at the same time, a degree of deafness, considerable stupor, and occasionally slight delirium. In the course of a few days, the coats of the eye sloughed at the upper part, and its contents were evacuated. While these changes were going on in the eye, collections of matter formed, without pain, in different parts of the body, on both shoulders, above the insertion of the deltoid muscles, over the sacrum, &c. The constitutional disturbance abated, and the collapsed eye healed over; but the patient never recovered his health. He died five months after, labouring under lumbar abscess. and worn out by hectic. On examination of the body, a portion of the jugular vein, to the extent of two inches, was found wanting; the upper and lower ends next the lost part being shrunk, ligamentous, and gradually lost in the cellular substance. On opening the head, pus was found effused in great quantity between the tunica arachnoidea and pia mater, along the base of the brain, and the whole length of the spinal cord. The intermuscular cellular substance of the loins was loaded with pus. Mr. Arnott asks, when we consider the circumstances of this case, the venous hæmorrhage, constitutional disturbance, formation of abscesses, and appearances presented on dissection, and compare them with the consequences which have been observed to follow inflammation and suppuration of a vein, and the occurrences in Mr. Earle's case, whether we can doubt that the affection of the eye, in this instance, arose from the inflammation of the jugular vein, and from the entrance of an inflammatory secretion, probably pus, into the blood.

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* Observations on Syphilis, p. 46. London, 1821.

† London Medical Gazette, vol. ii. p. 284. London, 1828.

"I have quoted these facts, both as interesting in themselves, and as illustrative of the doctrine of metastasis. It is evident that, if a destructive inflammation of the eye can be excited in consequence of the suppuration of a remote vein, a metastatic ophthalmia from suppurative inflammation of the urethra must be regarded as not so improbable an event as some have been disposed to consider it.

"There is a set of cases, however, in themselves highly important, and still more confirmatory of the possibility of a metastatic gonorrhœal ophthalmia. A disease of the eye, similar to that observed in the two cases above mentioned, occurring in the puerperal state, has been described by Dr. Hall and Mr. Higginbottom, in a paper published in the thirteenth volume of the Medico Chirurgical Transactions, under the title of 'Cases of Destructive Inflammation of the Eye, and of Suppurative Inflammation of the Integuments, occuring in the Puerperal State. and apparently from Constitutional Causes" In all of these cases, six in number, the affection of the eye took place in from five to eleven days after delivery. It was preceded and accompanied by serious indisposition, in every instance terminating fatally, and under symptoms of extreme exhaustion. The affection of the eye was characterized by redness of the conjunctiva, intolerance of light, and contracted pupil, rapidly followed by opacity of the cornea, and excessive chemosis. In two of the cases the coats of the eye gave way; and in one of these, where the process was observed. the rupture took place by ulceration of the coats round the cornea. In both of these cases, the collapsed globe had healed over previous to death. In each instance, only one eye was affected. and in five of them it was the left. In the case communicated by Mr. Ward, it does not appear which eye was the seat of the disease. With the disease of the eye, there also took place an inflammation of the integuments, first observed on the hand, but on careful examination, found in the inferior, as well as the superior extremities, and under which matter quickly formed. In one case only, there was no such inflammation. The authors of the paper conjecture, that the morbid affection of the eye had a constitutional origin. No examination after death seems to have been made in any of the cases. Mr. Arnott, in his comments on these cases, asks, whether, considering the circumstances under which the affection of the eye took place, its characters, and the depositions of pus under the integuments of the body, and comparing these with the known consequences of inflammation of veins, and the frequency of inflammation in the veins of the uterus after parturation, we may not be justified in attributing the disease of the eye to inflammation of the uterine veins, and the introduction of pus into the circulation. He cautions us against supposing him to regard the matter deposited in different parts of the body, under such circumstances, to be actually that which has been brought into the circulation from the inflamed vein or veins; stating that the question is no longer one of a translation of matter merely, but one which involves the very difficult subject of the pathology of the blood. Indeed, in these cases, although inflammation, ending in suppuration, occurred in the extremities, no deposition of pus appears to have taken place in the inflamed eye.

"I owe to Mr. James Brown, of this city, the opportunity of seeing a case of *puerperal ophthalmia,* which I have now no doubt was of the nature of the cases recorded by Dr. Hall and Mr. Higginbottom. The patient was a slender scrofulous woman, about 30 years of age, of irritable temperament, sedentary habits, and melancholy disposition. She had been seven times pregnant, and the following numbers indicate the months during which each utero-gestation was continued; viz. 9, 7, 5, 9, 9, 7, 4. She had formerly been subject to discharge from the vagina, probably leucorrhœal, but not immediately before the abortion in the fourth month, which led to her last illness. There was nothing remarkable about the labour. The lochial discharge was scanty, and did not continue above a week, at the end of which time she began to complain of pain in the back and groins, accompanied with slight colds and heats, and little, if at all, relieved by blood-letting and purging, both of which were copiously used. Some fifteen or eighteen days after delivery, she was seized with very severe rigors, followed by great pain in the head, back, and abdomen; the pain in the abdomen being complained of chiefly on pressure. The affection of the eye, which, as in the cases already referred to, was the left, came on about twenty-eight or thirty days after the former symptoms had been *apparently* subdued by the usual means, although, during all this time, the general state of the patient had been by no means favourable. The affection of the eye was ushered in by new rigors, which were followed by a good deal of fever, rather of a remittent type, and occasional feelings of sinking. The pulse continued from the first quick, irritated, and by no means strong. The eye was highly inflamed, the conjunctiva much chemosed, the lids swoln, and the lower lid everted. There was severe pain in the eye and head, and excessive intolerance of light, so much so that she was obliged to keep her face covered with a handkerchief, although the window-shutters were kept constantly closed. At first tears ran from the eye, and, after a time, purulent matter. The cornea became opaque, but the eye did not burst. Her mind was all along very desponding. For some days she was slightly incoherent, on coming out of sleep, but when roused was sensible to the last. No abscess formed near the surface of any part of the body. She died abought eight weeks after the abortion. It is to be regretted that neither the eye nor the body was permitted to be examined.

"It is far from being my intention to draw, from these facts, any other conclusion, regarding gonorrhœal ophthalmia by metastasis. than this, that they render such an affection somewhat less problematical. The facts themselves are valuable, nor could I omit giving an account of them, under some head or other.

"Saint-Yves appears to have been the first to speak of gonorrhœal ophthalmia from metastasis. His account of it is very short. He describes the conjunctiva as becoming hard and fleshy, the disease having commenced by an abundant discharge of white or yellowish matter. He states that. in most cases, the ophthalmia began two days after the commencement of the gonorrhœa, the latter discharge having at that period suddenly ceased, and thus caused a metastasis to the eye. He recommends blood-letting from the first, mercury, purgatives, and the warm bath. As local applications, he advises brandy and water, and a decoction of rosemary, sage, hyssop, and roses in red wine.*

"Succeeding writers have adopted Saint-Yves's view of the subject with too little hesitation, and appear to have investigated sufficiently neither the probability of the ophthalmia having arisen rather from inoculation than from metastasis, nor the change of there being no connexion between the two diseases. but merely a concurrence in the same individual.

"The causes of the suppression of the gonorrhœa, to which the rise of metastatic gonorrhœal ophthalmia is attributed, are exposure to cold, violent exertions of the body, the abuse of spirituous liquors, and the employment of astringent injections into the urethra.

"The following may serve as a specimen of alleged metastatic gonorrhœal ophthalmia.

"A captain in the army, aged 29, was ordered to mount guard at court, in the month of January, when he had a violent gonorrhœa. The day was excessively cold, and he was forced by his duty to remain a long time exposed to the air during the day and night. Towards midnight he began to feel the most violent pain in both eyes at once, which very soon increased to such a degree that he could not endure any kind of light. Next day, these symptoms were attended by a discharge of puriform matter from both eyes, and the albuginea appeared very much inflamed and swelled. A physician was sent for, unfortunately very ignorant, who ordered general remedies, as bleeding, purgatives, &c. with a fomentation of hemlock. The third day, on examining things more closely, the cornea was found completely opaque, and a hypopion formed; there appeared no ulceration. The hemlock was continued, without any effect. Ten or twelve days after, the inflammation began to abate, and the discharge from the eyes stopped; but the cornea did not recover its transparency, on the contrary, it was extremely thickened, and the patient remained entirely blind for life.†

"*Treatment.* The only point of treatment in cases of metastatic gonorrhœal ophthalmia, different from that which is to be followed when the disease is brought on by inoculation, is the attempt, so much recommended by some authors, to restore the suppressed discharge from the urethra. This is to be done by introducing a bougie into the urethra. covered with some of the purulent discharge from the eye, or with gonorrhœal matter from another subject. Even the simple introduction of a bougie may, perhaps. produce the effect which is desired; for any stimulus applied to the lining membrane of the urethra, provided it be of sufficient activity to determine an irritation and an abundant secretion of mucus, may produce a running similar to gonorrhœa. If this plan is adopted, the bougie must be retained in the urethra for several hours at a time, till the desired effect is produced.

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* Nouveau Traite des Maladies Yeux, pp. 187, 209, Paris, 1722.

† Swediaur's Treatise upon the Symptoms, Consequences, Nature and Treatment of Venereal or Syphilitic Diseases. Translated from the French. Vol. i. p. 245. London, 1819.

3. *Gonorrhœal Ophthalmia without Inoculation or Metastasis.*

"Various authors have related cases of ophthalmia occurring in individuals, who, either at the time when the ophthalmia attacked them, or a short time before its attack, had been affected with gonorrhœa. An alteration also has been observed by these authors between two diseases: that is to say, when the gonorrhœa came the opthalmia went, and *vice versa*. The conclusion drawn from such cases has been, that a relation exists between the two diseases, and that they are convertible the one into the other, without being metastatic. None of the authors who have described the cases to which I now refer, have explicitly attributed the production of the ophthalmia in question to the influence of nervous sympathy; and yet, if we throw inoculation and metastasis aside, there appears to be no other means by which the diseases of remote organs can be connected, except by nervous communication. The facts recorded upon the subject are valuable, whatever opinion we may form of the reasonings of those by whom they are narrated.

"*Case* 1. Swediaur states that a young man in London came to consult him for an ophthalmia. After he had tried the best remedies, internal and external, that he knew of for an ophthalmia, without effect, the patient left him. He heard nothing more of him for two months, when he returned to him with gonorrhœa. During his absence he had consulted several practitioners on account of his ophthalmia, but with no better success than before; but having caught a gonorrhœa eight days before returning to Swediaur, he had begun to feel his eyes better from the third day of the discharge. The ophthalmia had continued to diminish from day to day and he was now quite cured of it. Swediaur asked him if he ever had had gonorrhœa previously to the attack of ophthalmia. He said he had had it some time before he came to consult him first about his eyes; that he had suffered much, and for a long time, with it, but that at last the discharge had disappeared; and that he had not mentioned it, as he had not supposed there was any connexion between that gonorrhœa and the complaint in his eyes, which had come on several weeks after.

"Swediaur tells us, that this fact was too striking a lesson for him ever to forget it: and that he had never afterwards failed, in similar cases of ophthalmia, to ask the patient if he had not previously had a gonorrhœa, and if it had been properly treated and cured. He describes the ophthalmia in cases of this sort, as a chronic inflammation of the eyes, and especially of the eye-lids, attended very often with little ulcers of the sebaceous glands, and with an oozing of thick yellowish matter. In all such cases, especially when the patients told him that they had tried many internal and external remedies for the ophthalmia, he did not hesitate to advise the use of bougies for a couple of hours a day, as the surest and speediest way of curing the ophthalmia; and he tells us, that he had the satisfaction of seeing most of such cases cured even without any other external application.*

"*Case* 2. A sailor used all his influence to get appointed to the command of a frigate. He waited on the admiralty frequently, and was promised a ship; and in the meantime he went into Scotland grouse-shooting. Whilst there, he received instructions from the admiralty to take the command of a frigate then lying at Falmouth; he lost no time in setting out, but placed himself in the mail-coach for London. Just before he left Edinburgh, he had caught a gonorrhœa. On the journey, his eyes became inflamed; and when he reached London, he had a violent ophthalmia, with purulent discharge. He was in dreaful state both of body and mind, could not bear the light, and had great pain in the eyes. Mr. Abernethy, whom he consulted, asked him if ever he had had gonorrhœa or inflamed eyes before. He answered that he had had both the one and the other; and that when the discharge from his urethra was stopped, the eyes became bad, and when his eyes got well, the gonorrhœa returned. Mr. A. directed him to remain in a quiet darkened room, to wash his eyes frequently in the course of the day with tepid poppy water, to take five grains of the blue pill every night, with some castor oil to open the bowels, and to keep himself upon a strictly spare diet. During the first six days, he mended very slowly, and not considerably. But on the seventh day, when Mr. A. called, he found the patient sitting up in his room, the window uncovered, and his eyes almost well. Mr. A. expressed his surprise, and asked how this change had so suddenly happened, to which he answered, that he had had a number of very copious fœtid stools in the night, and that his complaints had left him. It seemed to be a sort of critical secretion from the liver and the whole of the alimentary canal, followed by an almost immediate removal of the irritable inflammation of the eyes.

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* Ibidem, p. 247.

"Mr. Abernethy, in his Surgical Lectures, spoke of such cases as the above as examples of an *irritable ophthalmia* attendant on gonorrhœa, very different from the purulent ophthalmia excited by touching the eye with matter from the urethra, and in fact a constitutional malady. He stated that he had seen many cases of both diseases; that he had known many people who were liable to rheumatism of the joints, to puriform discharges from the urethra, and to this irritable ophthalmia; and that these diseases used to alternate the one with the other. When the rheumatism ceased, the discharge returned from the urethra, and when the discharge from the urethra ceased, the affection of the eye returned, and thus one disease supervened upon another. He stated that if the surgeon is frightened at this irritable ophthalmia, supposing it to be one of the dreadful cases in which the eye is clapped, and proceeds to bleed and purge the patient severely, he will only make the matter worse. Moderate bleeding, he said, may be useful, but the chief object is to attend to the patient's general health. No means are so likely to be useful as setting the digestive organs to rights, and sending the patient to the country.*

"*Case* 3 Major ——, aged 25, contracted gonorrhœa in July, 1809. In about a fortnight after the appearance of the disease, he was seized with the usual symptoms of hernia humoralis. As these abated, pain and swelling commenced in the right knee, and being at this time under the necessity of travelling in an open carriage for a couple of days, at the end of the journey the pain and swelling had extended to the other knee, and to the foot and toes, especially the articulation of the great toe. Suffering under excruciating pain, and wholly deprived of the use of his limbs, he came under the care of Sir Henry Halford: but no treatment seemed to possess any power in removing the complaint: and, in addition, his right eye was suddenly attacked by a very violent inflammation, which threatened destruction to the organ. Having given up the use of medicine, he went to the country for the restoration of his health, and after being there three weeks, the gonorrhœa again increased, without any abatement of the other symtoms. The swelling and stiffness of the joints rendered him scarcely able to crawl without assistance. The use of the warm bath and a residence by the sea were recommended. From the former, he experienced little apparent benefit, but after a very tedious convalescence of two years, he found himself able to join his regiment in Spain. From this time he recovered the wonted use of his limbs, and experienced no return of his complaint, though exposed to all the hardships of the campaign of 1812. After exposure to a current of air when in a state of perspiration, he was seized with an intermittent fever, and obliged to return to England. At this time he had some increase of the stiffness of his joints. He continued to suffer from ague, and an impaired state of health, for nearly twelve months, when he returned to the active duties of his profession, and for some time enjoyed perfect health, and the free use of all his joints, till December 1814, when he again contracted gonorrhœa, with symptoms of unusual violence. In a fortnight the discharge began to abate, and violent pain, with swelling, attacked the great toe, and metatarsal ligaments of the right foot. The disease then proceeded to the knees, with the same violence of pain and swelling as on the former occasion. As the violence of the symptoms began to abate in the knees, the left eye was attacked by violent ophthalmia, and excited great alarm for its safety.

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* Lectures in the Lancet. Vol. vii. p. 5. London, 1825.

"Dr Vetch saw this patient in his convalescence from both the attacks of ophthalmia. The last inflammation of the eye appeared to have had its seat in the sclerotic coat, and on examining it more closely Dr. V. found an irregular and contracted pupil. with some opacity of the capsule of the lens, and adhesion between it and the iris. On causing him to shut the sound eye, the vision of the left was found very much impaired. Under the use of belladonna, and the muriate of mercury, the eye ultimately recovered beyond what Dr. V. had encouraged the patient to expect. Great thickening of the synovial membrane of the knee-joints remained in 1816, and the patient was still incapable of standing or walking. The urethra still continued subject to returns of gonorrhœal discharge.*

"The following particulars of this case are deserving of attention. On the first attack of ophthalmia, the right eye was the seat of the disease, on the second the left; in neither was there any symptom of purulency or chemosis to indicate disease of the conjunctiva: the disease in the urethra was neither suppressed nor modified by the attacks of ophthalmia; the last attack was decidedly one of rheumatic inflammation of the sclerotic coat and iris, an event (Dr. Vetch thinks) of more frequent occurrence, though more liable to be overlooked, in connexion with gonorrhœa, than purulent inflammation of the conjunctiva.

"The three cases above quoted, with the remarks subjoined to them by their different narrators, will serve sufficiently to show the diversity which exists in the opinions entertained regarding the ophthalmiæ, which in some individuals are found to attend gonorrhœa, or to alternate with this disease. It is quite evident that the ophthalmiæ which have been observed to do so are far from being uniform. That observed by Swediaur appears to have been little more than ophthalmia tarsi; that which occurred in Mr. Abernethy's case bears a strong resemblance to catarrhal ophthalmia, and probably was nothing more; while Dr. Vetch's patient evidently suffered from rheumatic sclerotitis and iritis As it is acknowledged that in none of these cases was there either inoculation or metastasis, it may fairly be doubted whether there was any connexion between the disease of the urethra and that of the eye, farther than that they occurred in the same individuals, while the occurrence of both might be attributed to a susceptibility for disease, arising from peculiar, or from debilitated constitutions. A succession of diseases in the same individual, recurring from time to time in nearly a regular order, and affecting distant and differently organized parts of the body, is by no means an uncommon occurrence, and must not rashly be considered as a proof that there is either a connexion between the different morbid affections which are found to succeed each other, or a similarity in their nature. Dr. Vetch's notion of gonorrhœa being sometimes rheumatic, and of rheumatic ophthalmia being sometimes gonorrhœal, which he has adopted from having met with gonorrhœa, rheumatism and iritis in succession, in the same patient, is a good example of hasty generalization in regard to diseases between which no other relation than that of concurrence has been pointed out.

"It may still be true, however, that a relation may occasionally exist between inflammations of the urethra and inflammations of the eye, and that these diseases may sometimes be convertible, independently of metastasis, although the kind of relation and the mechanism of the conversion are altogether unknown.

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* Vetch's Practical Treatise on the Diseases of the Eye, p. 243. London, 1820.

"I do not see that we are to gain any thing by adopting the name of *irritable ophthalmia*, bestowed by Mr. Abernethy on the disease which he has observed to attend gonorrhœa.

"Swediaur's hint, to employ the bougie, in cases of ophthalmia alternating with gonorrhœa, may probably be found of use; it is evident, however, that this remedy cannot be trusted to alone, but that the ophthalmia must be treated according to the particular symptoms it presents, not according to the conjectural notions entertained regarding its origin. In such a case as Mr. Abernethy's, anti-catarrhal, and in such a case as Dr. Vetch's, anti-rheumatic remedies would be required.

SCROFULOUS OPHTHALMIA.

"Scrofulous ophthalmia is distinguished from all the other inflammations of the eye by symptoms so very striking, that any one who has seen the disease once or twice, cannot mistake it, even although the general habit of the patient be concealed from him. Slight redness, great intolerance of light, pimples or small pustules on the conjunctiva, and specks on the cornea, resulting from these pimples, are the symptoms which characterize this ophthalmia; a disease to which scrofulous children are so liable, that out of the 100. 90 cases of inflammation of the eyes in young subjects are of this kind. It is very often the first manifestation of a scrofulous constitution; and, neglected or mistreated, becomes the frequent source of permanently impaired vision, or even of entire loss of sight. This disease seldom attacks infants at the breast; from the time of weaning till about eight years of age is the period of life during which it is most prevalent. Sometimes only one eye is attacked; at other times, both are affected from the first. Not unfrequently, the disease passes from the one eye to the other. When both are inflamed at once, the one is generally much worse than the other.

"*Symptoms*—1. *Redness.* At the commencement of the disease the redness of the conjunctiva is very slight. It often exists only on the inside of the lids. Sometimes a few scattered vessels are seen coursing through the conjunctiva towards the cornea; in other cases, no enlarged vessels are perceived, so that the disease in this incipient stage, is distinguished more by intolerance of light than by any direct signs of inflammation In most cases three or four enlarged vessels are discovered, running from either angle towards the cornea, or over its edge towards its centre. They are evidently superficial, and even project above the level of the conjunctiva. Not unfrequently they form a considerable fasciculus; and we know, from abundant experience of this disease, that at the end of such a cluster of vessels, a pimple is very likely to appear, if already there does not exist something of that sort too small, as yet, to attract notice. Although, in by far the greater number of cases, the redness is scattered, it sometimes happens that it is pretty general over the conjunctiva, even from the first. As the disease advances, the redness becomes increased, and the sclerotica also appears somewhat inflamed.

"2 *Pustules—Ulcers—Protrusions—Specks.* This ophthalmia is an eruptive disease. It affects the conjunctiva, not as a mucous membrane but as a continuation of skin over the eye One of the most remarkable symptoms of the disease is that at the apex of each of the bundles of blood-vessels, there arises one or more phlyctenulæ or minute pustules. In many instances, a single minute elevated point, of an opaque white colour, near the centre of the cornea, is all that is to be seen of this kind; in other cases, numerous pustules or phlyctenulæ are scattered over different parts of the conjunctiva, some on the cornea, and others over-the sclerotica. The edge of the cornea is a very common situation for them. They vary in size, according to the part of the conjunctiva in which they appear, being commonly smallest on the cornea.

"Beer has particularly mentioned phlyctenulæ as distinguished from pustules in this eruptive ophthalmia. We unquestionably meet with pimples of different sizes in this disease. Some patients have them all small, like what are termed phlyctenulæ, and others have them all large, like pustules. The former contain a smaller quantity of fluid, and that thin and colourless. The fluid contained in the latter is greater in quantity, and more like pus. I have not been able to decide whether there is any specific difference between the phlyctenular and the pustular cases. I have frequently observed that the pustular cases are not, in general, attended with so much intolerance of light. The cases in which children lie for weeks and months with their eyes shut, are phlyctenular. The pustular variety certainly does not differ from the phlyctenular merely in the inflammatory action being more severe in the former; for we meet with cases of very large pustules, in which the inflammation and pain are moderate, compared to what attend some cases of phlyctenula. The ulcer which succeeds to phlyctenula is sometimes superficial, but at other times it grows deep, and penetrates into the substance, or even through the cornea, so that no distinction can be grounded on the kind of ulcer which follows the bursting of these pimples.

"The phlyctenulæ and pustules which occur in scrofulous ophthalmia may be absorbed; and then, if situated on the cornea, they leave a little albugo, the effect of that effusion of coagulable lymph which surrounds every circumscribed abscess, but which will, in general, be totally removed by absorption, in the course of time. Occasionally it happens, that after an albugo is removed by absorption, a transparent dimple is left in the cornea, which is long of filling up. In some cases, we see the albugo begin to spread over the cornea in an irregular manner; pretty considerable red vessels running into it, and additional lymph being supplied to it, so as to form what I call *vascular speck*, which is a very tedious and troublesome symptom.

"Fully as often, these pimples burst, and become small ulcers, sometimes superficial and considerable in extent, more frequently deep and funnel-shaped. This forms one of the most distressing and formidable symptoms of the disease. Over the sclerotica, indeed, an ulcer, arising from the rupture of a phlyctenula, or pustule, is of less consequence; but, on the cornea, the transparent inlet of light, an ulcer of any description is an event exceedingly to be deprecated. It is very apt to disfigure the eye; and by the opaque cicatrice which it leaves behind, permanently to obscure vision.

"The formation of an ulcer, especially if it be situated on the cornea, always produces an increase of pain and redness, the pain being greatly aggravated on any attempt to move the eye, and accompanied by a gush of hot tears.

"The ulcer produced by a pustule is apt to become surrounded by a soft reddish edge, easily excited to bleed, especially if situated in the loose conjunctiva over the sclerotica; but on the cornea, the edge of the ulcer is sharper and more abrupt, and the surface, of a gray or ash colour, is frequently covered with an adhesive flocculent matter. It but too often happens that this kind of ulcer is permitted, by neglect or mismanagement, to penetrate gradually through the whole of the laminæ of the cornea, into the anterior chamber. Through the little fistulous opening of the cornea thus formed, the aqueous humour is discharged, and a small portion of the iris protruding, looks not unlike the head of a fly. Hence this symptom is termed *myocephalon*. This piece of iris unites, by adhesive inflammation, to the opening through which it is prolapsed, the ulcer around it gradually contracts, and whitens at the edge, the protruded portion of iris disappears, and a white indelible cicatrice of the cornea partially or entirely prevents vision. A cicatrice of the cornea is called a leucoma, in contradistinction to albugo; the latter opacity being the result of effusion, not of ulceration. If the ulcer has extended deep into the substance of the cornea, and much more if it has penetrated through it completely, the leucoma which follows remains for life, although in the progress of growth, and after a length of time, it may contract considerably. The cicatrice resulting from a superficial ulcer may entirely disappear. Indeed, the cicatrice from a superficial ulcer is sometimes transparent from the first.

"If several pustules form on the cornea at the same time, it sometimes happens that they unite with one another before they burst, so that the matter is infiltrated between the lamellæ, and thus a kind of onyx is formed. At other times, onyx appears at the lower edge of the cornea, independently of the existence of pustules.

"In some cases of ulcer of the cornea, the progress of the ulcer is unimpeded till the whole thickness of the cornea is penetrated, except the lining membrane, which seems to arrest the ulcerative process, but being unable to withstand the push made by the aqueous humour, is projected through the ulcer in the form of a small vesicle. This is what is called *hernia corneæ*. At last this vesicular protrusion gives way, the aqueous humour escapes, prolapsus of the iris follows, and a dense opaque cicatrice will be the result.

"Where there has been an extensive prolapsus of the iris, through an ulcer of the cornea, the pseudo-cornea which is formed over the protruded portion of iris, is sometimes unable to withstand the pressure of the aqueous humour, but is pressed forwards so as to form a partial *staphyloma*.

"3. *Pain—Intolerance of light—Epiphora.* The excessive intolerance of light which in general attends scrofulous ophthalmia, is one of the most striking and distressing symptoms of the disease. The child (for children are the usual subjects of this disease) is quite unable to open the eyes in the ordinary light of day, or by any act of volition to expose them so as to permit a satisfactory examination of their state; all his attempts to look up are instantaneously interrupted by strong, spasmodic contraction of the eyelids; for whole days, weeks, or even months, a child affected with this disease will lie on his face in bed; or, if forced out of bed, he will stand pressing his eyes against his arm, and no persuasion will bring him to lift up his head, or look at the light. The intolerance of light is always most severe in the morning. In the afternoon, it sometimes remits so much, as to allow the patient to open his eyes, and see to a very considerable degree, for some hours.

"It might, perhaps, be supposed that this excessive intolerance of light and spasmodic contraction of the orbicularis palpebrarum should attend only the worst cases, or where there was a great degree of inflammation. But it is not so. The mother or the nurse taking up the child, lays it across her lap, while the surgeon, receiving the head firmly between his knees, and laying hold of the eye-lids, without suffering the conjunctiva to become everted or protruded, raises the upper eye-lid, so as to expose the sclerotica; the cornea is turned up out of view, and it requires considerable management to elevate the upper lid so as to expose the cornea completely. But still this may be done, and before any prognosis can be given, must be done. In many cases, we are astonished when we thus examine the eye, to find only a very insignificant degree of redness, not more than we should find were we to examine a healthy eye in the same way, the cornea often perfectly transparent and entire, or perhaps a single minute spot of opacity on the cornea, with a few red vessels running over the sclerotica. The excessive intolerance of light exists in many cases almost alone. It is worthy of remark, that in many cases in which we find large pustules on the conjunctiva covering the sclerotica, the intolerance of light is not nearly so intense as in cases where the eruption is more of the phlyctenular sort, or even where there is, as yet, no sort of pimple formed.

"The intolerance of light in this disease is always attended with epiphora, and often by violent fits of sneezing. Whenever the patient voluntarily attempts to open the eye, or whenever we forcibly expose it, a gush of tears succeeds; the eye is thereby reddened, the eye-lids swell, and if the exposure is repeated from time to time, the cheek becomes chafed and excoriated. A pustular eruption rises on the face from the irritation of the tears, and the cheek sometimes becomes exceedingly swoln, red, and painful, from the same cause.

"There does not appear to be in general any very great degree of absolute or inflammatory pain attendant on strumous ophthalmia, not even when the patient attempts to open the eye. If we let the child alone, he will lie all day in some dark corner of the room, without complaining much of pain. But so excessively disagreeable to him is the least access of light, that he will rather forego all his little amusements, both within and out of doors, than open his eyes. It would appear, however, that it is not so much absolute pain which is excited, as a sensation similar to what arises in the eye, when exposed to the sun's rays reflected from the surface of a mirror—a sensation of intolerable glare and dazzling. Pain during the night, however, is not an unfrequent symptom. It seems to occur even during sleep, for the child often awakes screaming with pain in the eyes.

"Commonly a great degree of itchiness attends this disease, so that the patient rubs the eye-lids very much. There is also a feeling of sand in the eye, although not so remarkably as in the catarrhal ophthalmia.

"An anatomical fact, to which I have already had occasion to refer, may aid us in accounting for the extreme intolerance of light, spasmodic contraction of the eye-lids, and epiphora, which accompany this disease, even in cases where scarcely any redness is present namely, that the lachrymal nerve, after supplying the lachrymal gland, goes to the conjunctiva and orbicularis palpebrarum, and may serve to establish a strong nervous sympathy between these several parts. We see this sympathy called into action when any minute particle of dust fixes itself on the inside of the upper eye-lid. We have then the same intolerance of light, spasm of the orbicularis palpebrarum, and rush of tears, which we meet with in scrofulous ophthalmia, so that it would appear that this disease, even in its incipient stage, excites very much the same train of effects which follows the irritation of a particle of dust on the inside of the upper eye-lid.

"4. *Iritis—Ophthalmia tarsi.* Other local symptoms, besides those already enumerated, are often present. In some the iris suffers inflammation, although iritis is certainly a more frequent attendant on corneitis than on pustular or phlyctenular ophthalmia. Inflammation of the choroid, or of the retina, is still more rarely attendant on this disease. Very frequently we find it combined with ophthalmia tarsi.

"5 *Other scrofulous symptoms* may be detected in almost every case of this disease: as eruptions about the head, sore ears, swelling of the upper lip, running from the nose, excoriation of the nostrils, enlarged lymphatic glands under the jaw, exostosis of the fingers, swoln joints, tabes mesenterica, &c. With some of these symptoms we often find the ophthalmia to alternate, being aggravated, for instance, when sore ears cease to run, and mending when they again become sore. I have seen this ophthalmia repeatedly alternate with scrofulous swelling of the knee. The eruption on the scalp, which is generally met with along with scrofulous ophthalmia, is porriginous. Not unfrequently, an impetiginous eruption over the body is found to be present, especially in children who live much on milk.

"6. *A tumid and hard abdomen and disordered bowels,* commonly attend this disease. The stomach and bowels appear to be loaded with morbid secretions; and the evacuations are dark. The tumidness of the belly seems to be owing in part to muscular weakness.

"7. There is considerable *general debility,* especially in cases of long continuance. The skin is loose and flabby, and sometimes a great degree of emaciation is present.

The patient is hot and restless in the early part of the night, and sweats profusely towards morning. A great degree of fretfulness is produced by the disease, and prolongs its continuance.

"*Remote or Predisposing Causes.* 1, *The Scrofulous Constitution* may be regarded as the chief remote, or predisposing cause of this ophthalmia.

"That the scrofulous constitution very powerfully modifies local diseases, is a fact which must excite the attention of the most superficial observer. Indeed, by the term scrofula, we do not so much mean a disease of any particular set of organs, as a state of the whole system, predisposing different parts of the body to become affected with local diseases, and modifying those local affections which may arise from accidental causes.

"The description commonly given of scrofula applies too exclusively to that form of the disease in which it appears as an affection of the absorbent glands. Considered as a state of constitution influencing the origin and progress of local diseases, the accounts given of scrofula have sometimes appeared to be contradictory to one another. These apparent contradictions have arisen from the variety of appearances under which the scrofulous diathesis presents itself, and from its different effects in different cases. For instance, the scrofulous diathesis seems sometimes to hasten the progress of a local inflammatory disease, and at other times to prolong the process of inflammation. Beer has distinguished different classes of scrofulous patients; and, indeed, it requires but little experience of scrofulous diseases to observe that those individuals whose texture throughout is extremely lax, who have the nose and upper lip almost constantly swoln and scurfy, the abdomen uncommonly distended, and who are affected so frequently with chronic swellings of the lymphatic glands, form a sub-class sufficiently distinct from the general subjects of tubercles in the lungs. The latter are lively and irritable, and are rarely affected with the external lymphatic swellings, the crusta lactea, tinea capitis, ophthalmia tarsi, running from the ears, and diseased joints, to which the former sub-class are so very liable. Beer asserts, that the first sub-class are more subject to the pustular variety of scrofulous ophthalmia, and the second to the phlyctenular, and that the disease is generally much more tedious in the former than in the latter. He tells us also that the intolerance of light is not nearly so considerable in the first class as in the second; the pain is not so acute, the long continued spasmodic contractions of the eye-lids not nearly so common; the disease not at all so apt to pass into iritis, but more liable to be attended by inflammation of the Meibomian follicles, and this sometimes passing into puromucous conjunctivitis.

"Mr. Wardrop has published, in the second volume of the Edinburgh Medico-Chirurgical Transactions, an account of what he calls the *exanthematous ophthalmia*, which seems to be nothing else than the disease we are now considering. He says, indeed, that the scrofulous ophthalmia is a disease quite distinct from the exanthematous; but he neglects to point out a single diagnostic symptom by which the one could be known from the other, while his description corresponds exactly with that of scrofulous ophthalmia given by Beer and others. Mr. W. admits that persons of a scrofulous constitution are very subject to the exanthematous ophthalmia, 'from the same causes,' he adds, 'which render them also particularly liable to many other diseases; but neither the character of the ophthalmia,' says he, 'nor the eruptions with which it is connected, are necessarily derived from a scrofulous diathesis, nor does the disease appear in those alone where the scrofulous diathesis can be detected.' This looks like a sort of apology for those who are the subjects of this disease. Not only is the term *exanthematous*, as applied by Mr. Wardrop, nosologically incorrect, but his assertion as to the non-scrofulous nature of the disease is unsupported by any proof, and the giving this out as a newly-distinguished ophthalmia, is, I think, improper.

"Mr. Christian, of Liverpool, says he can distinguish the scrofulous from the porriginous ophthalmia, and thinks that the latter is excited by the contact of porriginous matter carried by the fingers of the child from the ears or from the head to the eyes. There is some plausibility in this, and the hint may very properly be adopted of preventing. as much as possible, the child from touching any porriginous or other eruption on its head, and afterwards conveying its fingers to the eyes.*

"2. *Food—Air—Exercise—Clothing.* While without any hesitation we regard the scrofulous constitution as the chief predisposing cause of this ophthalmia, we must not omit to mention that other remote causes evidently operate in its production; namely, improper diet, want of air and exercise, and insufficient clothing. It is from the operation of these causes that this ophthalmia and other scrofulous diseases are so frequent in large and crowded towns, and prevail so abundantly among the children of the poor who live in narrow streets and alleys, breathing an impure atmosphere, confined to a scanty and unnutritious diet, regardless of cleanliness, and ill protected from changes of weather.

"3. *Climate.* Our variable climate is a powerful promoter of scrofulous ophthalmia. In the south of Europe, on the other hand, for instance in the inland parts of Italy, this disease is rare, even among the poorest of the people, whose food is the least digestible and least nourishing. We see the effects of climate on this disease in the rapid changes which it undergoes when the weather becomes either suddenly cold and wet, or dry and warm. All the symptoms are greatly aggravated by the former, and as remarkably relieved by the latter. New attacks, both in those who have and those who have not previously suffered from this disease, are most prevalent during north-easterly winds.

"*Exciting causes.* 1. *Measles*, *Scarlet Fever* and *Small-pox* rouse into activity the scrofulous diathesis. These diseases themselves affect the eyes, and leave these organs tender, and apt to fall into this ophthalmia.

"2. *Catarrhal ophthalmia*, brought on in the common way, is extremely apt to degenerate, in scrofulous children, into the phlyctenular or the pustular.

"3. *Excessive use of the eyes*, on minute objects, and especially by candle light, is often the exciting cause of scrofulous ophthalmia.

"4. *Teething* is a frequent exciting cause.

"5. *Injuries*, as those produced by particles of dust lodging in the folds of the conjunctiva, slight blows, and the like, are often the occasional causes of scrofulous ophthalmia.

"*Prognosis.* It is necessary to give a very cautious prognosis in this disease. Much depends on the patient's pursuing the treatment methodically, not only till the cure seems complete, but for a considerable length of time after. No disease is so apt to relapse as scrofulous ophthalmia; the parents should be made aware of this, and directed to make instant application, whenever they observe a recurrence of any of the symptoms.

"When ulcers are present on the cornea, specks must necessarily follow. These will prove more or less obstinate, according to the depth of the previous ulceration, and will impede vision in proportion as they are more or less over the pupil. Perforating ulcer, followed by protrusion of the iris, leaves almost uniformly a dense leucoma, with deformed pupil.

"*Treatment.* We are obliged to speak of the treatment of strumous ophthalmia in very different language from what we employ in advising remedies for almost any other inflammatory disease of the eye. In other ophthalmiæ, we say, Follow this plan of treatment which we recommend, and the disease will speedily be overcome. We speak thus of the catarrhal ophthalmia, and of several others, but we cannot speak in this way of the scrofulous. We are forced to confess that in many cases this ophthalmia proves rebellions. If it it be asked why it does not yield even to the best directed treatment we answer this question by proposing another; namely, Why does an inflamed gland of the neck in a scrofulous individual, prove so troublesome, going on to suppurate in spite of every means adopted to promote resolution, and after it has suppurated and burst, continuing to discarge for years? The *strumous constitution* is the cause of the extreme tediousness of this ophthalmia, as well as of the frequently intractable nature of other strumous diseases; and till we discover means for curing scrofula, this ophthalmia will continue occasionally to mock, by its stubbornness, even the best and most carefully pursued plan of cure.

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* Glasgow Medical Journal, vol. i, p. 32. Glasgow, 1828.

"Is it incurable then? Are we to do nothing for it; but shake our heads, and leave the eyes to be destroyed? Not at all. Much may be done to relieve this disease. Although it is very difficult to cure it thoroughly, especially when the patient continues exposed to the influence of the same causes which originally produced it, yet it is rare indeed that medical treatment does not moderate the symptoms, and avert those changes in the transparent front of the eye, which, in neglected cases, are so often the causes of loss of sight. But when the practitioner does meet with cases, as sometimes he must do, which receive no benefit for weeks and months, but perhaps rather get worse, notwithstanding all that is done for them, he must not blame himself too much, but reflect on the intractable diathesis with which, in such cases, he is called to contend, and which he cannot change, and but too often can scarcely in the smallest degree meliorate.

"In the treatment of this disease, it is necessary constantly to bear in mind that it depends on a constitutional cause. To relieve the local affection, therefore, will not be sufficient. We must endeavour to improve the general health.

"1. *General Remedies.* 1. *Bleeding.* General blood-letting is hardly ever required; nor need local bleeding be had recourse to, unless considerable febrile excitement, as well as local distress, be present. When the inflammatory action runs higher than ordinary, or where it is suddenly or violently augmented by the formation of pimples or ulcers on the cornea, it is proper to moderate the impetus of the blood by the application of leeches to the eyelids or the temple. If the constitution is not as yet impaired by long continuance of the disease, and the employment of many debilitating remedies, repeated recourse must be had to the use of leeches, so long as the redness of the conjunctiva is considerable, and the intolerance of light acute. It must be kept in mind, however, that not unfrequently we may dispense with bleeding entirely, by putting the patient under the influence of tartar emetic; and that by depletion alone, no case of this disease can ever be cured. On the contrary, repeated bleedings, without the use of other remedies, reduce too much the general strength, and render the eye more susceptible of destructive changes.

"2. *Emetics and nauseants.* One of the most powerful and successful methods of treating scrofulous ophthalmia is by means of tartar emetic, either in such doses as to produce vomiting; in smaller quantities frequently repeated, so as to excite nausea, or combined with a purgative. There is, perhaps, no remedy in the whole materia medica which possesses equal powers of a sedative kind in this disease. It reduces very considerably the necessity of general and local blood-letting.

"I generally commence the treatment of a case of scrofulous ophthalmia with an emetic, either of ipecacuan or tartrate of antimony, and with uniform goods effects

"In cases where there is considerable quickness of pulse, I frequently put the patient on a course of nauseants or of emeto-cathartics. For instance, to an adult a mixture may be given of from one to four grains of tartar-emetic, with from one to two ounces of sulphate of magnesia, dissolved in a pound of water. Of this solution two or three table-spoonfuls may be taken every half hour, till vomiting is excited; after which, the dose is to be repeated at intervals of three, four, or six hours, as circumstances may require. This is the method to be followed in acute cases. In chronic cases, the nauseant may be exhibited at longer intervals. It may then be more conveniently exhibited in pills, each pill containing from a quarter to half a grain or more of the tartar emetic.

"In cases of children, the same solution of tartar emetic and salts may be employed, or a solution of tartar emetic by itself, or powders of the same rubbed up with a little sugar. From the twelfth to the sixth of a grain may be given, according to the age of the child, thrice a day. When there is much quickness of pulse, this plan will often prove effectual, while purgatives or tonics would produce little or no good.

"3. *Purgatives.* In children labouring under strumous ophthalmia, there is commonly a full and hard abdomen, and a loaded state of the stomach and bowels. Even in feeble and emaciated children, it will usually be found that, by the exhibition of purgatives, a large quantity of unnatural fœculent matter will be discharged. In such cases, the administration of purgatives is followed by marked benefit; and without these, other remedies avail but little. In recent cases, a purge of calomel, with jalap, rhubarb, or scammony, will often be sufficient to remove the attack of ophthalmia altogether. Such a purgative is to be repeated at intervals of two, three, or more days, according to the urgency of the symptoms. It not only empties the bowels, but reduces very powerfully the impetus of the blood in the affected part, increases the action of the absorbents, and restores to a healthy state the secretions of the digestive organs. It proves, in short, alterative, as well as depletive; and its use as such may be persisted in, in many cases, for a length of time, with very decided benefit. I have found the purgative plan to be more useful than any other, in those cases in which an impetiginous eruption over the body accompanies the affection of the eyes. Care, however, must be taken not to push its debilitating action too far.

"4. *Tonics.* There are several remedies of this class, which prove strikingly beneficial in the treatment of scrofulous ophthalmia.

"After a trial of numerous and various internal remedies in this disease, I have found none so useful as the sulphate of quina. It exercises a remarkable power over the constitutional disorder which attends this ophthalmia, and thereby over the local complaint. The dose which I employ is generally a grain thrice a day, rubbed up with a little sugar; in very young children, half a grain; and in adolescents or adults, two grains. Cinchona is not a new remedy in this ophthalmia. Dr. Fothergill recommended it many years ago, in very strong terms;* but its powers, in the form of powdered bark, or in any other form in which I have tried it are insignificant in comparison to those of the sulphate of quina. In most instances, its effects are very remarkable; and, indeed, (although I have met with a few cases which appeared to resist its beneficial influence) in most of the little patients to whom I have administered it, it has acted like a charm; abating, commonly in a few days, the excessive intolerance of light, and profuse epiphora, promoting the absorption of pustules, and hastening the cicatrization of ulcers of the cornea. The use of this medicine may be begun as soon as the stomach has been cleared by an emetic, and the bowels put to rights by repeated doses of calomel with rhubarb, or some other such purgative, unless the pulse is very quick, when small doses of tartar emetic will be preferable, or when an impetiginous eruption is observed on the surface of the body, in which case a course of purgatives ought to be adopted.

"I cannot forbear quoting, from the Journals of the eye Infirmary, the two following cases, illustrative of the good effects of sulphate of quina.

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* Medical Observations and Inquiries, Vol. i. p. 303. London, 1763. Also, Dr. Fordyce, in same vol. p. 192. Dr. Fothergill used a decoction of the powdered bark, with liquorice root.

"*Case* 1. Jane Thomson, aged 9, was admitted on the 23d of July, 1828, with strumous ophthalmia of the right eye, of fourteen days' standing. There was a deep ulcer near the centre of the cornea, surrounded by a broad effusion of lymph; and there was an onyx at the lower edge of the cornea. She was affected with night sweats, and was much reduced in general health by bleeding, purging, and blistering. She was ordered to take three grains of quina daily, a drop of the nitras argenti solution was applied to the eye, and she had the murias hydrargyri collyrium. On the 24th, the onyx was all but gone. On the 27th, the ulcer was reported as contracted. On the 29th, on account of an attack of bowel complaint, she was ordered two grains of calomel, with a quarter of a grain of opium at bedtime. After this the case continued steadily to improve, the ulcer cicatrized, the eye became strong, and the leucoma grew thin. In all probability, the cornea would speedily have been penetrated by the ulcer, if the depletory system had been persisted in, which this patient was undergoing before she came to the Eye Infirmary. Within 24 hours, the sulphate of quina had evidently arrested the progress of the disease.

"*Case* 2. James Tassie, aged 8, was admitted on the 15th of August, 1828, with strumous ophthalmia of the right eye. He had been troubled with this complaint, more or less, for seven years. There was formerly a considerable albugo on the right cornea, but it had diminished much till within a fortnight before his admission, when a relapse took place. The cornea appeared to be rough and nebulous, but the intolerance of light was so great that it was with difficulty that any part of it could be exposed. The nitras argenti solution was applied, and he had a solution of tartar emetic, in divided doses, till vomiting was produced. Next day he could open the eye better, and an onyx was now observed at the lower edge of the cornea, which had not been perceived on the previous day. He was ordered to take a grain of sulphate of quina thrice a day, and to use the murias hydrargyri collyrium. By the 18th, the onyx was gone. The extract of belladonna was applied to the eyebrow and forehead, some fears being entertained regarding the state of the iris. By the 20th, the intolerance of light having considerably subsided, the cornea could be more completely seen. The centre of it was found to be perforated by an ulcer, and the pupil contracted. On the 22d, the eye continued easier, but the iris was observed to be every where in contact with the cornea. The sulphate of quina, belladonna, and collyrium, were continued. On the 27th, the iris appeared to be returning a little into its natural place, the pupil was pretty visible, and he saw a little with the eye. On the 28th, the pupil was evidently expanding and the cornea clearing. By the first of September, the pupil was free of the cornea, except at its inner edge, where it still adhered by a single point. By the 16th, the iris was entirely free. Soon after this, the ulcer of the cornea cicatrized, the speck gradually cleared, and the eye retained a very considerable share of vision. This was one of the most remarkable and pleasing recoveries from penetrating ulcer of the cornea, and involved iris, which I have met with. The recovery was mainly attributable to the salutary operation of the sulphate of quina on the inflammatory affection, and to the mechanical effect produced by the belladonna.

"The chalybeates stand next to the sulphate of quina among the tonic medicines worthy of confidence in the treatment of scrofulous ophthalmia. The precipitated carbonate of iron, and the tartrate of potass and iron, are the forms which I have found most useful. They are more effectual, however, in the pustular than in the phlyctenular variety of this ophthalmia.

"An excellent tonic and laxative remedy in this disease is the common combination of rhubarb and supercarbonate of soda.

"The mineral acids, and especially the sulphuric, will also be found useful.

“ We may set down the cold bath as a very efficient tonic in scrofulous ophthalmia; but it is not to be employed till after the acute symptoms have subsided. At an earlier period, the tepid bath will prove soothing and refreshing, and ought to be frequently employed.

“ The employment of tonics, both medicinal and dietetical, must be continued long after all the inflammatory symptoms have disappeared, in order, if possible, to communicate to the constitution that degree of vigour, which may enable it to resist any tendency to relapse which may still linger in the eyes, and which, were this precaution not adopted, might, on exposure to the slightest exciting cause, lead to a new and severe attack.

“ We may class change of air among the tonic remedies for this disease, or rather among the preventives, which are to be employed after a first attack is subdued. A dry warm inland situation is preferable to the sea-coast. The glare from the sea is very apt to aggravate slight attacks, and give rise to relapses.

“ 5. *Alteratives.* Calomel is very often administered in strumous ophthalmia: more frequently, however, as a purgative than an alterative. That this medicine is injurious to children, does not admit of doubt. That their constitutions are often shattered by an indiscriminate use of calomel, and that in this way they are rendered more susceptible of suffering from the exciting causes of scrofula, is a truth which, at the present day, is overlooked to a most lamentable degree.

“ Given as an alterative in strumous ophthalmia, I have frequently known mercury prove injurious, because mistimed; that is to say, it was administered before the irritation attending the acute stage of the disease was moderated by depletion. After local blood-letting, and the use of evacuants, we sometimes find decided advantage from the exhibition of calomel with opium. This combination may even be pushed, in some cases, till the mouth is affected, with benefit.

“ *Diaphoretics.* Keeping up a healthy action of the skin is of much importance in this disease. This may be done by the tepid bath every second or third day, followed in adults by the use of the flesh-brush. Dover's powder at bedtime sometimes proves useful, by promoting a healthy action of the skin, as well as soothing irritation, and procuring sleep. In cases where the perspiration is immoderate, this medicine is not less remarkable for its good effects than where the surface of the body is dry and husky. Tartar emetic operates also with good effect on the skin, and sympathetically on the conjunctiva.

“ 7. *Diet.* During the continuance of an attack of active inflammation, abstinence from animal food, and from all kinds of fermented and heating liquors, should be strictly enjoined; but when the acute symptoms have subsided, and the disease has assumed a chronic character, the patient ought to be put upon rather a generous diet. As there can be no doubt that unwholesome food is one of the chief causes of scrofulous ophthalmia among the poor, it is of much importance to procure for the patients in these circumstances, a more invigorating diet. It is necessary strictly to forbid the use of articles likely to derange the stomach; as, pastry of every sort, comfits, vegetable jellies and preserves; and indigestible substances, as, unripe fruits, nuts, and the like.

“ 8. *Temper.* This disease is extremely apt to render the child fretful, and by mismanagement to lay the foundation of bad temper, which, on the other hand, tends much to prolong and aggravate the symptoms. We find in good-natured children, and in those who are under proper management, that the disease disappears much more readily; while in spoiled children, who cry perhaps for hours after the eyes are examined, or after the application of any remedy, it is apt to become almost incurable.

“ 9. *Position in bed.* The head should be raised as much as possible during the night. On no account, ought the child to be suffered to lie burying its face in the pillow.

"*Local remedies.* 1. *Shading the eyes.* The morbid irritability which marks this disease so strikingly through all its stages is to be relieved by wearing a broad greeen shade over the forehead; and by avoiding all employment of the eyes upon minute objects, especially in a strong light. It will not be necessary to confine the patient to a dark room, nor to forbid him from going abroad in fine weather. We often see children labouring under strumous ophthalmia with handkerchiefs bound over their eyes, especially when they are taken out of doors. This practice is decidedly injurious, heating the eyes too much, and adding to the intolerance of light.

"2. *Evaporation.* In recent and slight attacks, the inflammation, pain and irritability, may be moderated by the use of evaporating and slightly astringent lotions, applied tepid or cold, according to the feelings of the patient. In most instances, they agree better in the tepid state. A decoction of poppy-heads, with a few drops of alcohol; a weak solution of acetate of ammonia; a little rose water; or a solution of one grain of corrosive sublimate in eight ounces of water, will answer the purpose. The application of cold water to the eyelids, face and head, generally gives relief in this ophthalmia; but, in many cases, the reaction which follows this is hurtful. The same may be said of alum curd, and cold sugar of lead, poultices, enclosed in a thin linen bag, and laid over the lids at bedtime.

"3. *Fomentations.* When the symptoms are in any degree severe or of long continuance, warm, soothing applications will be found more useful than cold ones. With a bit of sponge or flannel, the eyes may be fomented once or oftener in the day with hot decoction of chamomile flowers, or of poppy heads, or with a hot infusion of opium. Much relief is experienced from exposing the eyes to the vapour of laudanum, or of camphor, raised by means of a cupful of hot water. Warm poultices during the night are often useful. They are to be made with crumb of bread, warm water, or sugar of lead-water, and a litle fresh butter; and never with milk.

"4. *Scarification* of the inside of the eyelids, especially in chronic cases, where the palpebral conjunctiva is much loaded with red vessels, will be found one of the most valuable means of cure. In cases of vascular speck, division of the fasciculus of vessels running over the sclerotica to the albugo, cannot be dispensed with: no other remedy having the same power in checking this very annoying and dangerous symptom.

"5. *Counter-irritation* We derive great benefit from blistering in this disease. The intolerance of light is often suddenly and almost completely removed by this remedy, the child being enabled, in a few hours after the blister rises, to open its eyes, although it had not done so for months before. The temples, behind the ears, the crown and back of the head, and the nape of the neck, are the situations generally chosen for the application of blisters. The last is the most painful, but not the least effectual. In general, the discharge ought to be kept up, by the use of some stimulating dressing; or if this is not done, a quick succession of blisters ought to be employed.

"Friction with tartar emetic ointment has sometimes been had recourse to in this disease, for the purpose of bringing out a crop of pustules. This is a practice much more painful than blistering, the pustules, if considerable in size, leave indelible pits, and from mismanagement of the remedy, large portions of skin are sometimes made to slough; so that, on the whole, blistering is preferable.

"Issues in the neck or on the arm are beneficial, both in relieving the symptoms of strumous ophthalmia, and in preventing relapses.

"6. *Stimulants* applied to the inflamed surface of the eye, in this disease, are decidedly useful. Indeed it is scarcely possible to effect a cure without them The impetiginous state of the conjunctiva or in other words of the skin covering the eye, which constitutes strumous ophthalmia, not merely bears stimulants, but like most other chronic cutaneous diseases, is uniformly benefitted by their application, if they be well chosen, carefully used, and properly timed. They often act as the best local sedatives, if applied after the acute inflammatory excitement is subdued by the general remedies already enumerated. Employed before this is effected, they will scarcely fail to prove hurtful. In this respect, the treatment of scrofulous ophthalmia is directly contrary to that of the puro-mucous inflammations of the conjunctiva; for in them we employ stimulants from the very first, but in the scrofulous ophthalmia we must delay till the symptoms of irritation are somewhat abated.

"Various stimulants have been used in this ophthalmia; but the nitras argenti solution and the red precipitate salve are the most deserving of confidence. Next to them I would place the vinum opii. Whichever be selected, its application must be continued with regularity once a day, or once every two days, the child being laid in the horizontal position, the head fixed between the knees, and the lid opened so as fully to expose the diseased membrane. The solution of four grains of the nitras argenti in one ounce of distilled water is the stimulant which I generally employ. It evidently possesses very considerable power in abating the vascularity of the conjunctiva, hastening the absorption of pustules, cicatrizing ulcers, and clearing specks of the cornea. The relief which it affords to the intolerance of light is not the least of its good effects. In this, it probably operates by inducing the healing of minute ulcerations, and the contraction of enlarged blood vessels, both of which give rise to the sensation of sand in the eye, to spasm of the lids, and epiphora. Whenever ulceration is present on the cornea, recourse should be had to the solution of nitras argenti. A stronger solution than that of four grains to the ounce of distilled water may be employed, and with a small camel-hair pencil applied directly to the surface of the ulcer, without permitting the solution to spread over the rest of the eyes.

"7. *Solid Caustic.* Where an ulcer threatens to penetrate deep into the substance of the cornea, or when it has already perforated into the anterior chamber, with or without prolapsus of the iris, it is proper to touch the ulcer, or the myocephalon, every second or third day, with a pencil of lunar caustic, filed to a sharp point. Scarpa has given the best account of the effects of this remedy, to which I shall again have occasion to refer, under the head of *ulcers of the cornea.*

"8. *Belladonna.* The case of James Tassie, already detailed at page 394, strikingly illustrates the utility of applying the extract of belladonna in cases of central ulcer of the cornea. Even when the edge of the pupil is involved in such an ulcer, the dilating power of the belladonna may be sufficient to free it, and thus to preserve the pupil entire. In cases of perforing ulcer near the edge of the cornea, I am inclined to refrain from the use of belladonna; for, while the dilatation cannot in this case be carried so far as to remove the iris from the vicinity of the ulcer, I believe the state of palsy, into which the iris is thrown, is apt to favour, rather than prevent prolapsus.

"*Relapses.* No disease is so apt to recur as scrofulous ophthalmia. It is, therefore, necessary for children who have once suffered from it to be submitted, from time to time, to the inspection of their medical attendant, who must endeavour promptly to subdue every symptom of a re-attack, and to conduct his patients safely through that period of life which is most exposed to the disease. In this way, much mischief will easily be prevented, which, neglected, may require years to remove, or prove altogether beyond remedy.

ERYSIPELATOUS OPHTHALMIA.

"Beer has described an erysipelatous conjunctivitis. It appears to be a rare disease.

"*Symptoms.* It commences with a slight feeling of tension in the eye, and parts immediately surrounding it. The conjunctiva becomes of a pale red colour; and rises in soft, yellowish-red vesicles round the cornea. These take a different form from every motion of the eye-lids, and are sometimes so large as to project from between their edges. On strained or rapid motion of the eye-ball, or eye-lids, the patient feels a pricking pain in the eye. When the eye-lids are a little open, the vesicles give the patient the appearance of one who is weeping, and we expect that, at every moment, the tears will drop from his eye; but, on a nearer inspection, and on pulling down the lower eye lid, we discover the cause of the mistake, into which we are the more ready to fall, as during this inflammation there frequently is a discharge of tears, especially on sudden changes of temperature. The eye is somewhat impatient of light. No other diseased appearances are observed in the eye itself; but the eye lids seem also to be more or less affected with erysipelatous inflammation. At the end of the acute stage, the pain of the whole eye is increased, still exciting in the mind of the patient the comparison of pressing or stretching, especially on moving the eye or eye-lids.

"As the disease continues, the redness of the conjunctiva increases. It becomes, indeed, generally so red, that we discover no longer a mere net-work of blood-vessels, but a general, yet pale, and sometimes livid redness. Yet this pale red colour is not uniform. It is contrasted with spots of different sizes, of a bright red colour, which arise from extravasation of blood into the cellular substance between the conjunctiva and sclerotica. The vesicles become more considerable, and project still more from between the half-opened eye-lids. The spaces between the vesicles are covered with a thin white mucus, which is secreted in unnatural quantity by the conjunctiva and Meibomian glands. The discharge of tears is also increased. During the night the eye-lids are glued slightly together, so that it is with some difficulty that the patient opens them in the morning; when they are opened, the cornea appears somewhat dim; but when the eye has been carefully cleared, we see that the apparent dimness of the cornea arises entirely from the mucus collected on its surface.

"As the disease begins to subside, the secretion of mucus returns to its natural quantity, the redness of the conjunctiva gradually disappears, and those portions of that membrane which had been elevated in vesicles, re-approach and re-attach themselves to the tunica albuginea and sclerotica. The discharge of tears ceases to be so frequent and so abundant. Those spots which arose from the extravasation of blood are the last symptoms to disappear. They become of a yellowish-red colour. There continues, even for a long time, such a diminution of the connexion between the conjunctiva and sclerotica at these places, that the conjunctiva falls into wrinkles whenever the eye-ball is moved. It is long before it recovers completely its natural pliancy and pellucidness.

"*Causes.* This disease arises from sudden changes of atmosphere, slight blows, the stings of insects, and various other causes.

"*Treatment.* Much depletion is not necessary. The exhibition of a purgative, the opening of the vesicles with the point of a lancet, and the excitation of the cutaneous system by gentle diaphoretics, will in most cases constitute the whole of the necessary means of cure.

VARIOLUS OPHTHALMIA.

"In former times small-pox proved but too often the cause of serious injury to the eyes, or even of entire loss of sight. It was by far the most frequent cause of partial and total staphyloma. But since the introduction of inoculation, and still more of vaccination, such injurious effects from variolous ophthalmia are much more rare.

"*Symptoms.* In most cases of small-pox, pustules form on the external surface, and on the margins of the eye-lids. When they are numerous, as in confluent small-pox, they cause such swelling of the lids as completely to close the eyes. As the disease proceeds, matter is discharged partly from the Meibomian follicles, partly from the variolus pustules, the eye-lids are glued together, so that the eyes cannot be opened for days, and merely from this state, without any pustules being formed on the conjunctiva, the eyes are irritated and painful. At last, as the disease subsides, the swelling of the lids falls so that they are again opened, and the eyes may be found uninjured. It is in this way that the vulgar talk of persons being blind in small-pox for so many days, and then perfectly recovering their sight. But although the cornea has not suffered in these cases, the eye-lids and the lachrymal apparatus are often left in an injured state, and not unfrequently small-pox proves the exciting cause of strumous affections of the eyes and eye-lids, which may continue troublesome for years. The small-pox pustules on the lids are apt to destroy the eye lashes, to leave red marks and scars render the edges irregular, and liable to inflammation and excoriation from slight causes, and to produce ophthalmia tarsi, and very frequently trichiasis and distichiasis. Chronic blenorrhœa of the lachrymal sac, and pustular conjunctivitis, are also frequent sequelæ of small-pox.

"Schemes have been proposed for preventing the pustules of small-pox from spreading to the face, or at least for moderating the effects of the eruption. We find that this disease is apt to attack with peculiar severity any part of the surface of the body labouring at the time under accidental irritation, and hence it has been supposed that soothing applications may moderate the eruption and its effects. Covering the face with a cloth spread with cerate, and from time to time with chamomile decoction, have been used for this purpose, and can do no harm. When the pustules on the eye-lids are fully matured we may afford considerable relief by pricking them one by one with a needle, so as to evacuate their contents; and by carefully removing the crusts which form after the pustules burst, having first softened them with some mild ointment. The lids are frequently to be bathed with tepid milk and water, and bits of soft rag, moistened with the same, are to be laid over them.

"There is, in every case of small pox, some redness of the conjunctiva. But danger is chiefly to be apprehended when a variolous pustule or pustules appear on the cornea, where, unfortunately, they are much more apt to occur than on the conjunctiva covering the sclerotica. A pustule on the cornea, forming at the time of the general eruption, is extremely apt to prove destructive. When it bursts, the ulcer thus formed but too often deepens and spreads, the cornea is penetrated, the iris advances and adheres, the pupil may thus be obliterated, or the cornea being much changed in structure, and adherent, in a great part of its extent, or completely, to the iris, partial or total staphyloma may be the result. In bad cases, almost the whole of the cornea is destroyed, by infiltration of matter and ulceration.

"During the suppurative stages of small-pox, it is difficult to say what extent of mischief is going on in the eye, under the closed and swoln eye-lids. If the patient feels pain in the ball itself, with dryness, stiffness, and a sensation of sand in the eye; if the uneasiness be much increased on attempting to move the eye, or on exposing it to light, even through the swoln lids; and if, in addition to the matter discharged from the pustules on the edges of the lids and from the Meibomian follicles, there is a frequent discharge of hot tears, then it is probable that there is acute variolous conjunctivitis, and perhaps pustules on the cornea. But if the eye is easy, only shut up from the state of the lids, there is probably no danger.

“The eyes, however, are not safe, even after the small-pox pustules over the body have blackened and the scabs fallen off. I have seen both pustule of the cornea and onyx produced, after the general eruption was completely gone. This has been called, with sufficient propriety, *secondary variolous ophthalmia.* It sometimes occurs as late as five or six weeks after the patient has recovered, from the primary disease. It is certainly not so severe an affection as the primary, but is still dangerous in regard to vision. A dull, whitish point is observed in the cornea, with surrounding haziness; the whiteness becomes more extensive, amounting perhaps to the 12th of an inch in diameter, and then the part becomes yellow. If two or more such points should form, the whole cornea is rendered nebulous; or this effect may be produced even from one large variolous pustule. An onyx, at the same time, may appear at the lower edge of the cornea. The sclerotica is reddened. Pain and epiphora are excited, on exposure to light.

“The secondary variolous ophthalmia seldom leads to destruction of the cornea. By proper treatment, the matter of the pustules or onyx is sometimes absorbed. In other cases, ulceration takes place, leaving, after cicatrization, a permanent leucoma, or white speck. The surrounding haziness of the cornea is gradually dissipated; vision is injured according to the situation and size of the leucoma. By the formation of an artificial pupil, vision may, in many cases of this sort, be restored. Even when partial staphyloma has formed, this operation is often applicable.

“*Treatment.* The best general treatment of small-pox must be followed; a moderate temperature, tepid ablution, and a cool regimen. Emetics are occasionally useful: even blood-letting may be cautiously employed in some cases, and laxatives are always to be administered. If the eyes are particularly affected, they must be frequently bathed with tepid water, or poppy decoction, and the edges of the lids smeared with a little cold cream. In many cases, the lids are so much swoln, and so completely sealed up, that it would be in vain to attempt any application to the conjunctiva, till the eruption begins to fade, and the swelling to fall. Leeches may be applied, not only without impropriety, but with decided advantage, behind the ears or on the temples, and followed, if it appear necessary, by blisters. About the eighth or ninth day of the eruption, free purging will be found useful, not merely in reducing the suppurative fever, but in relieving the uneasy and inflamed state of the eyes. The lids now begin to be opened, so that a little fluid can be injected between them and the eye-ball. A weak solution of nitras argenti, or diluted vinum opii, may be used for this purpose.

“As to the treatment of secondary variolous ophthalmia, I have found tartar emetic, given so as to vomit and purge freely, to be productive of the best effects, evidently abating the inflammation, and promoting the absorption of the pustules and onyx. Leeches and blisters are also useful. As soon as the acuteness of the inflammation is somewhat abated by these means, much advantage will be gained by putting the patient on a course of sulphate of quina. Undiluted vinum opii appears to answer best as a local application. The eye is to be touched with it once a day. Belladonna is to be applied to the eye brow, in order to keep the pupil dilated.

MORBILLOUS AND SCARLATINOUS OPHTHALMIA.

“A certain degree of conjunctivitis always attends measles and scarlet fever, but is in general much much less severe than the variolous inflammation of the eye. In measles and scarlet fever, the change which the skin undergoes, amounts to little more than vascular congestion, and the conjunctiva, a prolongation of the skin, betrays therefore little more during the presence of these diseases, than some degree of redness, with intolerance of light, slight pain, and epiphora. Occasionally, however, we have phlyctenulæ, onyx, and ulcers of the cornea, brought by the morbillous and scarlatinous ophthalmiæ, particularly when the subject is scrofulous. Indeed, it is difficult to distinguish either of these ophthalmiæ from the scrofulous, till the eruption on the skin makes its appearance. On the other hand, we often hear of the dregs of the measles, and of scarlet fever, producing affections of the eye and eyelids. By this is generally meant that the scrofulous diathesis has been called into action by these diseases, and that ophthalmia tarsi or phlyctenular conjunctivitis has been the result.

"In measles there is a catarrhal affection of the Schneiderian membrane, with sneezing and cough, and occasionally the attending conjunctivitis is not so much eruptive as blenorrhœal. I have seen cases in which the eye had been destroyed by severe puro-mucous ophthalmia excited by measles.

"In some rare cases of scarlatinous ophthalmia, the iris and capsule of the lens become affected I operated some time ago on a boy of about eight years of age, in whom specks of the anterior hemisphere of the capsule were brought on in this way.

"*Treatment.* The affection of the eye in measles and scarlet fever, does not, in general, require active treatment. The eyes should be guarded from strong light, bathed occasionally with tepid water, and the bowels kept freely open. If the symptoms are more than commonly severe, leeches may be set on the temples and blisters applied behind the ears, or to the nape of the neck. The nitras argenti solution will be found highly useful, whether the ophthalmia be eruptive or puro-mucous. Sulphate of quina may be given internally, with good effects.

RHEUMATIC OPHTHALMIA.*

"It has already been stated, that the three inflammatory diseases of the eye, most frequently arising in adults from atmospheric influences, are the catarrhal, the rheumatic, and the catarrho-rheumatic.

"*Diagnosis.* The following particulars will serve sufficiently to distinguish the rhematic from the catarrhal ophthalmia.

"1. *Seat of the disease.* The catarrhal ophthalmia is an affection of the conjunctiva; the rheumatic has its seat in the albuginea and sclerotica, and extends occasionally to the iris.

"2. *Redness.* The redness in the catarrhal is reticular, and the turgid vessels are evidently conjunctival; in the rheumatic, the chief redness is radiated or zonular, and seated under the conjunctiva.

"3. *Nature of the inflammation.* The catarrhal ophthalmia is an inflammation of a mucous membrane, and is a blenorrhœal or profluvial disease, attended with an increased and morbid secretion of mucus; the rheumatic attacks the fibrous membranes of the organ of vision, and is unattended by any morbid secretion from the surface of the eye.

"4. *Pain.* The pain in the catarrhal ophthalmia arises on the surface of the conjunctiva, and is compared to the sensation of roughness, or to the feeling which might be excited by sand or broken glass under the eye-lids, does not extend to the head, and is felt most in the morning, or when the eyes begin to be moved: the pain of the eyes in the rheumatic ophthalmia is pulsative and deep-seated; the chief pain, however, is not in the eye, but round the orbit, in the eye-brow, temple, cheek, and side of the nose, and is severely aggravated from sunset till sunrise.

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* Sclerotitis Rheumatica vel Atmospherica.

"If it be asked, "What is meant by *rheumatic* ophthalmia?" I should reply that—

"1. I mean simply inflammation of the fibrous tissue of the eye, (the sclerotica), and of the surrounding parts of similar structure, excited by exposure to cold.

"2. I do not believe it to be an inflammation differing from common inflammation *in kind*, in consequence of the existence of what has been called the rheumatic habit, or diathesis. When atmospheric influence produces catarrh, we never hear the occurrence referred to a mucous diathesis; nor, when pleuritis arises from the same cause, do we attribute the disease to a serous diathesis. The same exciting cause, affecting a fibrous instead of a mucous or a serous membrane, produces a new train of symptoms, dependent not on the constitution of the person, but on the structure and functions of the part affected.

"3. Rheumatic ophthalmia frequently occurs in individuals who have never suffered from rheumatism in any other part of the body.

"4. When rheumatism quits a joint and attacks the heart, which I have known prove fatal, we say it is a metastasis from the former to the latter situation; but such a translation of rheumatic inflammation I have never myself observed in regard to the eye. In all the cases of rheumatic sclerotitis which I have witnessed, the disease was primary, whether in rheumatic or non-rheumatic subjects, never metastatic."

We perceive our author very sanguine in his remarks respecting rheumatic ophthalmia, not admitting a diathesis as likely to give rise to the disease. I am firmly impressed with the opinion that frequent attacks of rheumatic symptoms in the different joints does engender in certain fibro-cartilagenous tissues a susceptibility. When, then, a cause has acted upon the sclerotic coat at the time rheumatic symptoms are present in any distant part, I believe the same symptoms may be transferred to that coat. Again: Persons who are the subjects of rheumatism, are exceedingly prone to sclerotitis, from the most trifling exposure to atmospheric vicissitudes. That a rheumatic diathesis is present, in more than five cases in ten of those who are affected with rheumatic sclerotitis, I have not the least doubt.

"5. I have adopted the term *rheumatic ophthalmia*; but, perhaps, *sclerotitis atmospherica* would be a truer appellation. It must be confessed, however, that this inflammation of the eye resembles rheumatism in its exciting causes, its accompanying pain, its exacerbations, and its cure. It has not been generally recognised as rheumatic, probably because it attacks a structure which is covered only by a thin semitransparent membrane, and therefore exposed to direct examination; while the other seats of rheumatism, unlike this, are hid from our by the whole thickness of the common integuments, and are the subjects, therefore, more of conjecture than of actual observation.

"*Degree of frequency.* The pure rheumatic ophthalmia is comparatively a rare disease. For one case of pure rheumatic, we meet with perhaps ten cases of catarrhal ophthalmia, and six of that mixed kind called catarrho-rheumatic, in which both conjunctiva and sclerotica are affected, and the symptoms of the two former ophthalmiæ combined. We seldom see both eyes affected with rheumatic ophthalmia at once. When both are attacked, the one is always much more severely inflamed than the other.

"*Local symptoms.* 1. The fasciculi of sclerotic vessels advance in radii towards the edge, and sometimes even a little over the edge of the cornea pretty equally on all sides They are larger and more turgid than the radiating vessels seen in iritis, and rise more from the surface of the sclerotica. The conjunctivitis which attends this ophthmalmia is slight, and never such as to mask the radiated inflammation of the sclerotica.

"2. There is, in general, no tendency to chemosis in the pure rheumatic ophthalmia, nor do the eyelids take part in the disease.

"3. Dimness of vision uniformly attends this ophthalmia, depending on an accompanying haziness of the cornea and pupil, attended by a slight contraction of the latter, and sluggishness in the movements of the iris. If only one eye is affected, which, at least for some time, is generally the case, the pupil of that eye is seen at once to be less than that of the sound eye. The iris becomes even slightly discoloured; it becomes greenish, for instance, if naturally blue; and the attending iritis may go on to evident effusion of coagulable lymph within the pupil. It must be understood, however, that a severe degree of iritis rarely attends this rheumatic sclerotitis.

"4. Except haziness of the cornea and pupil, which may be attributed to slight effusion, it has never happened to me to witness any other of the secondary phenomena of inflammation in pure rheumatic ophthalmia. I have not seen the disease terminate in any form of suppuration or of ulceration, both of which are very common in the catarrho-rheumatic ophthalmia.

"5. The access of light does not in general prove very distressing to the patient in rheumatic ophthalmia. The affected eye feels dry and hot in the early period of the disease: but after a time, especially when the symptoms are somewhat abated by blood-letting, there is considerable epiphora.

"6. The pain which attends the rheumatic ophthalmia at its commencement is of a stinging kind, and extends from the eyeball to the orbit, and neighbouring parts of the head. These parts feel hot to the patient, and even to the hand of the observer. The pain is strikingly augmented by warmth. It often affects the forehead, the cheek-bone, and the teeth; extending sometimes even to the lower jaw. Occasionally, it is precisely confined to one half of the head. In some instances, it is severe on the side, or even in the cavity of the nose, or in the ear. But, above all, the eyebrow is its chief seat, and next to it the temple and the cheek. It is not unfrequently the acute pulsatory pain of phlegmon, especially when felt chiefly in the eyeball; in other cases, and particularly around the orbit, it consists rather in an agonizing kind of feeling, which distresses and wearies out the patience of the person affected. It never ceases entirely, so long as the disease continues; but it varies much in degree, coming on with severity about four, six, or eight o'clock in the evening, continuing during the night, becoming most severe about midnight, and abating towards five or six in the morning; till then totally preventing sleep, and occasioning great distress. The patient never fails, in the history he gives of his case, to insist on the nocturnal pain, and with his finger to point out its circumorbital seat. It is much more in the forehead, temple, cheek, and side of the nose, than in the eye. It is reasonable to conclude that in this disease the periosteum in and around the orbit, and the fascia of the temporal muscle, (structures similar to the sclerotica), are also affected with rheumatism; but the chief seats of the pain are, in all probability, the branches of the fifth pair of nerves distributed to the face, and we may fairly attribute a considerable portion of the pain to the sympathy which these nerves have with those belonging to the eyeball.

"*Constitutional Symptoms.* A considerable degree of symptomatic fever attends this disease, increasing along with the nocturnal paroxysms of pain. The pulse becomes frequent, and sometimes strong, full, and hard. The tongue is white and furred, and the mouth ill-tasted; there is more or less nausea, and the skin is hot and dry. The digestive organs are deranged, the appetite impaired, the bowels generally confined, and the excretions morbid.

"The progress and severity of the disease vary much in different cases. In some the attack is slight, and soon goes off, without permanently injuring the organ. At other times, it is extremely severe, and, if misunderstood, may soon destroy vision. Not unfrequently the disease falls into a chronic state, without being very severe.

"*Exciting Causes.* Rheumatic ophthalmia may be distinctly traced, in most instances, to exposure of the eye to a continued blast of cold air, while the head and face are in a state of perspiration. The patient, in the history which he gives of his case, commonly mentions some particular exposure of this sort, soon after which the redness and rheumatic pain commenced; for example, sleeping with the head exposed to the air entering by a chink in the wall, or by a broken pane of glass; travelling during the night, with one side of the head close to the broken window of a carriage; suddenly issuing from a crowed room into the cold air of the street; exposure to the blast which flows from the stage into the body of a theatre; keeping wet clothes on the head when over-heated; and the like.

"I have not observed that this disease is much more apt to occur at one season of the year than another. It is certainly more prevalent when the wind is cold and north-easterly. It is much more apt to attack persons of middle age than either the young or the old. Indeed, I have never seen it in children, nor in those far advanced in life. Probably the same exciting causes which, in persons of middle life and robust constitution, are apt to induce rheumatic ophthalmia, would in a child excite catarrhal or scrofulous ophthalmia, and in an old person the catarrho-rheumatic. Rheumatic ophthalmia is very apt to re-attack an individual who has previously suffered from it.

"*Treatment.* 1. *Blood-letting.* In plethoric persons, with a full and hard pulse, and indeed in almost all cases of rheumatic ophthalmia, it is necessary to take away blood from the arm, and to apply leeches to the forehead and temple. I feel myself obliged to differ entirely from Mr. Wardrop in his opinion that patients affected with rheumatic ophthalmia neither bear bleeding to a great extent, nor are much relieved by this remedy. He has even stated the little relief afforded by bleeding in this disease, as one of is diagnostic characters.* This entirely disagrees with my experience; and is, I apprehend, altogether contrary to what we observe in other rheumatic affections. Bleeding, both general and local, I have uniformly found extremely useful in rheumatic ophthalmia, and I believe it ought seldom, if ever, to be omitted. The first night, after taking fifteen or twenty ounces of blood from the arm, the patient is generally so much relieved as to get some sleep, even though no other remedy be employed. Next day, I am in the habit of applying a dozen of leeches round the eye; but, if the pulse be strong and full, and the circumorbital pain not relieved, I first repeat the venesection.

"2. *Calomel and Opium.* I have never failed to find this combination highly useful in checking the circum-orbital pain, and dissipating the other symptoms of this ophthalmia. Two grains of calomel, with one of opium, are to be continued every evening till the gums begin to be affected, when the calomel may be omitted, and ten grains of Dover's powder substituted for the opium Mr. Wardrop states that mercury, given in this disease, so as to produce pytalism, aggravates more than mitigates the symptoms This does not correspond with what I have observed. I do not, indeed, push the mercury in order to affect the mouth, but I have not witnessed any bad effects from the mouth becoming sore.

"3. *Opiate Frictions.* The patient experiences great relief from carefully rubbing the forehead and temple with warm laudanum. Beer used opium moistened with saliva. Friction with either of these assuages the pain, if already present, but ought to be employed rather about an hour before the nocturnal paroxysm is expected, which it will greatly lessen, and sometimes entirely prevent. In chronic cases, equal parts of laudanum: and tincture of cantharides, may be used for this purpase.

"4. *Blisters*, repeatedly applied behind the ear, and to the temple, but above all, a large blister to the nape of the neck, will be found useful.

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* Medico-Chirurgical Transactions. Vol. x., p. 13. London, 1819.

"*Belladonna.* During the whole course of rheumatic ophthalmia, the pupil of the affected eye ought to be kept under the influence of belladonna, either by smearing the moistened extract upon the eyebrow and eye-lids every evening, at bed-time, or by infusing one drachm of the extract in each ounce of the laudanum which is used for rubbing the head.

"*Purgatives.* A laxative clyster every morning, or a small dose of Epsom salts, may be given to obviate the constipating effects of the opium. More powerful purgatives are improper, as they would carry off the calomel and opium, and thereby prevent their good effects.

"7. *Sudorifics.* The warm pediluvium at bedtime, with warm diluent drinks towards evening, operating along with the opium, will, in general, excite a sufficient degree of diaphoresis. Mr. Wardrop recommends antimonial powder, and Beer employed guaiac for exciting the skin in this disease.

"*Tonics.* Small doses of sulphate of quina, or of the mineral acids, will be found advantageous in the chronic stage of the disease, and during convalescence. In old mistreated cases, Fowler's solution sometimes gives great relief, in doses of from eight to twelve drops, thrice a day.

"9. *Vinum Opii.* Applications to the eye itself have but little power over this disease. Those which are so useful in other ophthalmiæ, are often hurtful in the rheumatic. The lunar caustic solution, for instance, which may be regarded as a specific in catarrhal ophthalmia, is in the present disease decidedly injurious. When all the febrile and painful symptoms, however, are gone, and little more than lingering redness, with weakness of the eye, remains, the vinum opii, in a diluted state, will be found beneficial, dropped upon the eye twice or thrice, or the pure vinum opii, once, daily.

"The first, second, third and fifth of these remedies are to be had recourse to in the first instance. I have never seen these remedies fail in any acute case, however severe; nor have I seen any permanent sequelæ, when the plan of treatment now explained was adopted with the necessary vigour.

CATARRHO-RHEUMATIC OPHTHALMIA.

"This compound ophthalmia is one of the most common, and also one of the most severe and dangerous. In old persons especially, it is often the source of permanently diminished vision, and not unfrequently of entire loss of sight in the eye attacked.

"*Symptoms.* 1. As both the conjunctiva and the sclerotica are affected, the symptoms are more complicated, and also more various, than those of unmixed conjunctivitis or sclerotitis.

"2. The feeling of roughness, or of sand between the eye-lids and eye-ball, the secretion of puriform mucus, and puriform Meibomian fluid, are sufficiently indicative of the part taken in this disease by the conjunctiva. The nocturnal accession of racking circumorbital pain marks the affection of the sclerotica.

"3. In some cases of catarrho-rheumatic ophthalmia, the conjunctivitis is severe, the sclerotitis slight; but more frequently the sclerotitis is severe, and the conjunctivitis not so considerable.

"4 In this disease, the conjunctiva and sclerotica are attacked simultaneously. Occasionally it happens, in the course of pure rheumatic ophthalmia, that the patient, from some new exposure, becomes affected also with catarrhal conjunctivitis: more rarely does an attack of rheumatic sclerotitis supervene in catarrhal ophthalmia. But in catarrho-rheumatic ophthalmia, both membranes appear to be attacked at once, in consequence of the influence of one and the same exciting cause.

"In this disease, the redness is evidently both conjunctival and sclerotic. Under the moveable network of the conjunctiva, we perceive the immoveable zonular inflammation of the sclerotica. In pure catarrhal ophthalmia, the sclerotica, no doubt, partakes in the inflammation of the investing tunic, but no paroxysms of rheumatic pain are present; the sclerotica suffers sympathetically, not primarily. In pure rheumatic ophthalmia, also, the conjunctiva is reddened, from contiguous sympathy with the structure which it covers, just as the skin is reddened over a joint suffering from acute rhematism; but neither the conjunctiva in the one instance, nor the skin in the other, is the seat of the primary disease. Besides, in pure rheumatic ophthalmia, the conjunctiva betrays no marks of profluvial disease.

"6. Chemosis, or inflammatory œdema of the subconjunctival cellular membrane, is by no means an uncommon attendant on catarrho-rheumatic ophthalmia. When it does occur, it hides from view the sclerotic redness.

"7. The disharge from the conjunctiva in this disease is never profuse, and seldom opaque. It amounts, in general, rather to a mere increase of mucus, than a flow of pus, and renders the lids more than usually moist and slippery.

"8. The eye-lids adhere together in the morning, from the inspissated Meibomian secretion. Not unfrequently they are also externally red and swollen.

"9. Considerable intolerance of light and epiphora attend this ophthalmia in all its stages, but especially in those cases where the structure of the cornea is affected.

"10. The conjunctival pain, which is compared to the feeling produced by sand between the eye-lids and eye-ball, is felt most in the morning, or when the eye-lids are moved. The sclerotic pain is nocturnal, and observes the same periods of renewal, violence, and abatement, which are observed in rheumatic ophthalmia. The conjunctival pain is referred to the surface of the eye, and sometimes to the forehead. The sclerotic pain is circumorbital.

"11. In this disease, the cornea is extremely apt to suffer from ulceration, and from effusion of pus between its lamellæ. Indeed, there is no ophthalmia to which adults are exposed, in which ulcer of the cornea and onyx are so frequent as in the catarrho-rheumatic. If this disease is neglected for eight or ten days, and especially if the patient be far advanced in life, we almost uniformly meet with one or other, and not unfrequently with both of these symptoms.

"12. The ulcer is peculiar. It spreads over the surface, rarely penetrating deeply into the substance of the cornea. It generally cicatrises without leaving any opaque speck, the cornea remaining merely irregular, as if part of it had been hacked off with the lancet; and of course vision, from imperfect refraction, is indistinct. Professor Beer and Mr. Wardrop have described this kind of ulcer as attendant on pure rheumatic ophthalmia, but I have never seen it except in catarrho-rheumatic cases. Professor Beer mentions that it originates in a phlyctenula, but I have never had an opportunity of seeing any appearance of this kind. If the case continues to be neglected, or if it be mistreated, this ulcer ceases to be superficial; the substance of the cornea is more deeply attacked, and an opaque leucoma will be the result.

"13. Onyx, or effusion of pus between the lamellæ of the cornea, is the most alarming of all the symptoms of this ophthalmia. It generally commences at the lower edge of the cornea, in shape like the white spot at the root of the nails, convex on its upper edge, gradually increasing, mounting upwards, separating more and more the lamellæ between which it is effused, and greatly adding to the sufferings of the patient. It reaches not unfrequently to such a height as to implicate more than half of the cornea. The pus of an onyx in catarrho-rheumatic ophthalmia is very rarely absorbed. The cornea becomes ulcerated over the centre of the onyx; the pus is evacuated; the ulcer but too often penetrates through the posterior lamellæ of the cornea; the aqueous humour escapes; the iris falls forward into contact with the ulcerated cornea; in nine cases out of ten these parts adhere together, and the result is partial or total staphyloma.

"14. As the onyx goes on advancing, there is commonly also an effusion of lymph into the pupil, which becomes, first of all, less vivid in its motions, the colour of the iris changes, the pupil becomes hazy, contracts as the onyx increases, and may at last be obliterated.

"15. In some cases, the onyx is accompanied by hypopium, or effusion of pus, into the anterior chamber. In other cases, the onyx bursts first into the anterior chamber; false hypopium is thus produced, and ultimately the cornea gives way.

"16. If, fortunately, the matter of an onyx be absorbed, albugo remains for a considerable time, but gradually diminishes, and may ultimately almost entirely disappear. If the onyx is dispersed by the cornea giving way, leucoma is the result, and never entirely disappears. Staphyloma cannot result, unless the iris and cornea have become partially or totally adherent. Mr. Wardrop has remarked, that partial staphyloma generally affects the inferior half of the cornea.* The reason is, that partial staphyloma is commonly the consequence of onyx, which, in nine cases out of ten, takes place at the lower edge of the cornea.

"17. In catarrho-rheumatic ophthalmia, the pulse is generally quick and sharp, the tongue white, and mouth ill-tasted. The nocturnal pain completely prevents sleep, till about sun rise. Catarrh sometimss attends, and adds to the febrile symptoms.

"18. We generally find that the rheumatic symptoms yield first to treatment; the catarrhal continuing for some days longer. But, in some cases, I have observed the reverse; the circumorbital pain continuing, at least in a certain degree, after all the catarrhal symptoms were gone.

"*Causes.* The causes of catarrho-rheumatic ophthalmia appear to be similar atmospheric influences to those already enumerated as giving rise to catarrhal and rheumatic ophthalmiæ. Amongst the poor, the disease may, in general be traced to cold, to which the patients have been exposed, particularly during the night, from deficient clothing and want of proper shelter. Like other inflammatory and rheumatic affections, it is more prevalent during north-easterly winds.

"Beer thought that cold draughts of air,† playing upon the eye, excited rheumatic ophthalmia; and that foul air‡ caused catarrhal ophthalmia. According to this view, air at once corrupted and impelled with force against the eye, especially when the head is covered with perspiration, will be the most likely cause of catarrho-rheumatic ophthalmia.

"That the discharge from the conjunctiva in catarrho-rheumatic ophthalmia, if applied to the conjunctiva of a healthy eye, will excite a puro-mucous conjunctivitis, is extremely probable. We can be at no loss to distinguish catarraho-rheumatic ophthalmia from that stage of contagious conjunctivitis in which the inflammation spreading inwards to the deep-seated textures of the eye-ball, excites sympathetic circumorbital pain.

"Beer mentions that catarrho-rheumatic ophthalmia sometimes occurs in children, and still more frequently in old persons, along with suppression of urine. But he seems to reject the conclusion of some, that this is any thing more than an accidental coincidence; and he gives us no hope that diuretics would be particularly serviceable, even though they restored the secretion of urine.§

"We meet with catarrho-rheumatic ophthalmia much more frequently in old persons than in the young or middle aged.

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* Morbid Anatomy of the Eye. Vol. i. p. 106. London, 1819.

† Eine kalte Zugluft.

‡ Ein zersetzter verdorbener Luftkreis.

§ Lehre von den Augenkrankheiten. Vol. i. p. 310. Wien, 1813.

“*Treatment.* The successful treatment of this disease does not depend so much on any new remedies, as on a proper selection of some of the means already recommended, either for the catarrhal or for the rheumatic ophthalmia.

“1. *Venesection* appears to be as necessary in the catarrho-rheumatic as in the pure rheumatic cases, and is attended by as remarkable relief to all the symptoms, especially to the circumorbital pain. According to the severity of the case, and the age and constitution of the patient, from ten to thirty ounces of blood may be taken from the arm, and the same quantity on the day following, if the symptoms are not greatly relieved.

“2. *Leeches* to the temple are also highly useful, particularly when applied soon after venesection.

“3. *Scarification* of the conjunctiva of the eye-lids is to be employed when there is any considerable degree of chemosis.

“4. *Calomel and opium* are productive of the same good effects in this ophthalmia as in the pure rheumatic. The dose, and the length to which the calomel should be pushed, are the same.

“5. *Opiate frictions* on the forehead and temple are to be used about an hour before the expected attack of circumorbital pain.

“6. *Belladonna* is to be applied, so as to keep the pupil dilated.

“7. *Blisters* behind the ear, or to the nape of the neck, are to be employed.

“8. *Purgatives,* as a brisk dose of calomel and jalap at the beginning, and a gentle laxative every morning during the course of the disease, do good.

“9. *Sudorifics,* as the solution of acetate of ammonia, diluent drinks, the warm pediluvium, and a flannel under-dress, will be found useful.

“10. *Tonics,* as sulphate of quina and the mineral acids, are to be given in the chronic stage of the disease.

“11. *Solution of nitras argenti.* As in the catarrhal, so in the catarrho-rheumatic ophthalmia, the solution of from two to four grains of nitras argenti in an ounce of distilled water, dropped upon the conjunctiva once a-day, relieves the feeling of sand, and speedily removes the other symptoms of conjunctivitis. This application, however, has no effect on the sclerotic part of the disease; and in this ophthalmia I should consider it a very dangerous mistake to trust almost solely to this remedy, as we may safely do in pure catarrhal inflammation of the eye, and thus neglect the appropriate means for reducing the attendant inflammation of the sclerotica.

“12. *Vinum opii.* Before the catarrhal part of this disease is subdued by the solution of nitrate of silver, this remedy rather aggravates the symptoms. After the conjunctivitis and the acute sclerotitis have yielded, it operates favourably, as in the chronic stage of the pure rheumatic ophthalmia.

“13. The *Collyrium muriatis hydrargyri,* one grain to eight ounces is to be used, tepid, three or four times daily, for bathing the eye.

“12. *Unguentum præcipitati rubri* is to be smeared along the edges of the eye-lids at bed-time. These two remedies are employed as part of the treatment suitable for the conjunctival part of the disease.

“15. With respect to the treatment of onyx, I would not recommend the pus effused between the lamellæ of the cornea to be evacuated by the lancet. In every case in which I have done this, partial or total staphyloma has been the result. When I have left the onyx to itself, the case has sometimes recovered, beyond my most sanguine expectations. This I attribute to the sorbefacient influence of the calomel over the lymphatic effusion into the pupil, which always attends extensive onyx; to the continued use of belladonna, and to the gradual preparation of the cornea by nature for its giving way, and for its healing up—a preparation which must be entirely defeated, when we venture to open the onyx with the knife.

SCROFULOUS CORNEITIS.

"The cornea is liable to suffer in most of the ophthalmiæ which we have already considered. It is apt, as has been stated, to become the seat of pustules and abscesses, to be attacked by ulceration, rendered opaque, or almost entirely destroyed. Also, in some of the ophthalmiæ which we have still to consider, the cornea is occasionally, or always affected. But the disease to which we have now to attend is specifically different from every other. It is not a puro-mucous affection, and although occurring only in strumous subjects, it is not eruptive. Its development and progress are slow, occupying weeks, months, and in some instances years. It appears to be chiefly the conjunctival layer of the cornea, and the substance immediately beneath that layer, which are affected in this disease.

"*Symptoms.* 1. The redness is principally in the sclerotica and on the surface of the cornea. The sclerotic redness is in general not very considerable, of a carmine colour, inclining to purplish, the vessels very minute, and arranged zonularly round the cornea. Not unfrequently there is a reddish ring, somewhat elevated, formed around or upon the edge of the cornea, while red vessels, more or less numerous, are traceable over its surface to its centre. In some cases, the whole cornea is so much covered, that it assumes a red colour, and has been compared, in this state, to a piece of red cloth; a symptom which has, therefore, been styled *pannus*. In chronic cases, the visible arteries of the eye-ball, derived from the recti muscles, are much dilated.

"2. The cornea is more or less opaque, and rough. The roughness frequently resembles the dotting which might be produced by touching the surface of the cornea all over with the point of a pin. In other instances, the depressions are somewhat larger, and assume, under the magnifying glass, the appearance of a crowd of minute ulcers. In every case, we find that the surface of the cornea has lost its natural polish; and from this circumstance, even when little opacity is present, the eye appears dull, and vision is indistinct. In some instances, the opacity amounts to haziness only; in others, it consists in a streaked or speckled whiteness, arising from depositions of coagulable lymph, with interstices of clear cornea. Not unfrequently the surface of the cornea becomes completely and almost uniformly white. Here and there we occasionally observe upon it elevated points of a yellowish colour, which never appear to suppurate or ulcerate.

"3. In many cases of scrofulous corneitis, we find the cornea more convex than natural, or even in some degree conical, and the aqueous humour superabundant; or, in other words, there is a certain degree of hydropthalmia.

"4. Dilatation of the pupil not unfrequently attends this disease in its pure state, and, in many cases, there is an evident tendency to amaurosis. But in other instances the iris is inflamed; and, when this is the case, the pupil is contracted, and may even, from effusion of coagulable lymph, become adherent to the capsule of the lens. In many cases of corneitis, it is difficult to recognise the state of the iris and pupil, through the hazy or speckled cornea. Considerable assistance will be derived, under such circumstances, from concentrating the light upon the surface of the cornea, by means of a double convex lens.

"5. There is not, in general, any great degree of intolerance of light in this disease; scrofulous corneitis presenting, in this respect, a striking contrast to phlyctenular conjunctivitis. This symptom, however, is variable; for, in some cases, the patient cannot bear the light, and there is considerable epiphora.

"6. There is little or no pain, except, perhaps, in the commencement of the complaint After a time, the eye falls into a chronic, indolent state of inflammation, unattended by pain, especially after the whole cornea has become opaque.

"7. The pulse is quickened, the patient is restless in the night, and the skin is commonly harsh and dry.

"8. The subjects of scrofulous corneitis are, in general, about the age of puberty, and in the female the complaint frequently appears connected with amenorrhœa. In the female as well as in the male, I have, in many instances, observed it coincident with a peculiar hoarseness of voice. Other strumous symptoms are generally present, especially swoln lymphatic glands under the jaw, and nodes on the tibia.

"*Corneitis* appears to be the appropriate name for this disease. The cornea is evidently the chief seat of the morbid changes. They commence apparently in the cornea, and sometimes are almost, or altogether, confined to that part. I have seen the opacity of the cornea without almost any of the sclerotic redness.

"*Causes.* The occasional causes of scrofulous corneitis are obscure. I have known it arise from exposure during the night to the glare of flambeaux. Cold has probably a considerable share in producing it; but it is never attended by the racking circumorbital pain of rheumatic sclerotitis.

"*General Treatment.* 1. *Depletion.* This may, perhaps, appear to be but seldom indicated, at least by any urgency of pain, or signs of active inflammation. Yet we find considerable advantage from the application of leeches to the neighbourhood of the eye, especially in the beginning of the disease, or when the patient complains of pain or tension in the eye, or across the forehead. They ought to be repeated from time to time; but not so frequently as to reduce too much the general strength.

"2. *Emetics* and *Purgatives* are also useful. They are to be employed according to the directions laid down at pages 392 and 393.

"3. *Tartar Emetic.* as a sedative and alterative, I have found decidedly advantageous, both by itself in doses of from the twelfth to the fourth of a grain thrice a day, and along with Peruvian bark. This combination is no doubt unchemical, but I have certainly derived more benefit from these two medicines given together, than from either of them singly.

"4. *Diaphoretics* are indicated by the dry and harsh state of the skin Tartar emetic will operate favorably on the skin, and may be assisted by the warm pediluvium, and a dose of Dover's powder, at bedtime.

"5. *Mercury*, carried to such a length as to effect the mouth, is of great service in the treatment of this disease. It is not to be commenced, however, in general, till the acute symptoms have been removed by depletion of different kinds, and the employment of tartar emetic in small doses. When the mercury begins to act decidedly on the constitution, we generally find that enlarged vessels on the cornea contract, and the newly deposited matter becomes absorbed. The clearing of the cornea commences around its circumference, the favourable change gradually advancing towards the centre. The best form, in which to administer mercury in this, as in some of the former ophthalmiæ, is calomel with opium. Mercury is peculiarly necessary in those cases which are attended with iritis, and in them ought to be employed from the first.

"6. *The Sulphate Quina* exercises an influence over scrofulous corneitis, slower of manifestation, but in the end not less beneficial, than that which the same medicine displays in phlyctenular ophthalmia.

"7. *Vegetable alteratives,* as colchicum, sarsaparilla, and elmbark, are useful remedies in scrofulous corneitis, although inferior to cinchona and sulphate of quina. Whichever alterative is selected, it must not be soon abandoned, although slow in producing beneficial effects. Many cases are under treatment for a whole year or even longer, before they perfectly recover.

"*Local means of cure.* 1. *Warm fomentations* with poppy decoction, and exposing the eyes to the vapour of hot water and laudanum, give great relief in those cases in which the presence of light proves irritating.

2. *Blisters* and *issues* on the neck, behind the ear, and on the temple, are useful and generally necessary.

3. *Stimulants.* I have tried many different remedies of this class. They are admissible, only after the symptoms of acute inflammation are subdued. On the whole, most advantage appears to be derived from vinum opii. It is to be used once a day, after the acute symptoms have subsided. Next to vinum opii, I would place the red precipitate salve. About the bulk of a split pea is to be introduced daily between the lids and the eyeball, and then carefully rubbed upon the surface of the cornea through the medium of the upper lid. From half a drachm to a drachm of red precipitate, triturated along with an ounce of white sugar into an impalpable powder, and blown into the eye through a quill, is another mode of applying the same substance. The lunar caustic solution, applied in the usual way, and a solution of four grains of sulphate of zinc in an ounce of water, injected over the surface of the eye, are attended with good effects. The advantage is sometimes very evident of employing in the course of the twenty-four hours, more than one of these stimulants; for example, vinum opii in the morning, and red precipitate salve at bedtime.

"4. *Belladonna* is to be used in extract, smeared on the eyebrow and upper eyelid, every evening, when there are either evident symptoms, or even only a suspicion, of inflammation of the iris.

"5. *Evacuation of the aqueous humour* appears to be indicated in those cases in which there exists a tendency to hydrophthalmia.

"The discrimination of inflammation of the iris* has formed a highly important addition to our knowledge of the diseases of the eye. Iritis, (as we may readily conceive from the fact that the iris is nourished by two arteries, totally unconnected with those which belong to the other textures of the eye,) often exists as independent of inflammation in the other membranes of this organ, as conjunctivitis, sclerotitis, or corneitis; and on account of the important functions which the iris performs, as well as of the insidious and dangerous nature of the complaint, this disease is still more deserving of attention than the ophthalmiæ already considered. The danger chiefly to be dreaded from the iritis, depends on the fact, that this disease partakes of the nature of adhesive inflammation, so that in the course of a few days of a neglected or misunderstood attack, the pupil may become completely and irremediably obliterated by an effusion of coagulable lymph. It cannot be denied that there always attends upon this disease a degree of sclerotic inflammation, that the anterior hemisphere of the crystalline capsule is in every case more or less affected, and that but too often the inflammatory action extends to the choroid and retina. Yet, the iris is plainly the focus of the diseased action, and where the most striking morbid changes take place. It is upon the pupillary edge of the iris the disease commences, whence it spreads to the rest of the iris, to the capsule, and it may be, to the choroid and retina, while the sclerotic inflammation appears to be sympathetic. That the iris is in many, even of the most severe cases, the only part which has permanently suffered, is proved by the fact, that an artificial pupil is often found to restore vision, when the natural pupil has been closed from inflammation, plainly showing that the choroid and retina had been scarcely, if at all, affected.

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* Schmidt uber Nachstaar und Iritis nach Staaroperationen. Wien, 1801.

"*Symptoms.*—There are certain symptoms which characterize inflammation of the iris, from whatever cause it proceeds

"1. Zonular sclerotitis; fine hair-like vessels running in radii towards the edge of the cornea.

"2. Discolouration of the iris. If naturally blue, it becomes greenish; if dark-coloured, reddish.

"3. Contraction, irregularity, and immobility of the pupil.

"4. Effusion of coagulable lymph in the pupil and posterior chamber, and occasionally into the anterior.

"5. Adhesion of the iris, and especially of its pupillary edge, to the capsule of the lens; in some rare cases, to the cornea.

"6. Dimness of sight, and sometimes almost total blindness.

"7. Pain in the eye, and nocturnal circumorbital pain.

"In every case of iritis, a sufficient number of these symptoms will be met with, to enable the observer to decide on the seat of the disease which is before him. All of them are by no means invariably present. We sometimes find, for instance, a dilated pupil in iritis, probably from the existence of amaurosis; and in some otherwise well-marked cases, there is not the slightest circumorbital pain. The disease may also exist in a very marked manner, without any effusion of lymph, or preternatural adhesion of the iris, these being part of the changes which take place only in the second stage of iritis.

"*Causes.* Inflammation of the iris arises from various causes. Those best ascetained are the following

"1. Exposure to atmospheric changes, and especially to transitions from heat to cold, gives rise to rheumatic iritis.

"2. Constitutional syphilis, and syphiloid diseases.

"3. Strumous inflammation of the iris occurs along with corneitis, as a secondary disease; while in some less frequent cases, we met with a strumous iritis which may be regarded as primary.

"4. There is a very peculiar iritis, called arthritic by the Germans, who consider it as connected with gout.

"5. Injuries, as the operations for cataract.

"Besides these different varieties of iritis, others have been described, which ought, however, in all likelihood, to be brought under one or other of those just enumerated; as, one from the action of mercury [*] and another consequent to typhus fever [†]

"*Degrees and Prognosis.* Iritis is met with of very different degrees of severity.[‡] In slight and recent cases, complete restoration may be promised; in severe and neglected cases, it is but too often evident that no hope can be held out of our being able to restore the power of vision, or even to save the form of the eye

"1. In what may be termed the *first degree*, the vasculari y in front of the sclerotica is often so slight as to be barely perceptible, existing sometimes only in one or more points, or behind the upper eyelid, where it might not be discovered, unless the lid was raised, and a careful examination made of the whole surface of the eyeball. The annulus minor of the iris, or narrow ring next the pupil, is slightly discoloured. The pupil is of medium size, but wants its usual clean sharp edge, and may even be slightly angular or misshapen. It has lost its jet black appearance, is discernibly hazy, and its motions are limited and slow. Vision is slightly obscure and confused, so that when the patient is eagerly engaged in business, he closes the affected eye. No severe pain attends this degree of the disease, and there is scarcely any aversion to light. In this state iritis may exist for many weeks, and yet, by suitable treatment, may be so completely overcome that no vestige of disease in the appearance or action of the iris shall remain.

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[*] Travers on Iritis, in Surgical Essays by Cooper and Travers Vol. i p. 66. London, 1818.

[†] Hewson's Observations on the History and Treatment of the Ophthalmia accompanying the Secondary Forms of Lues Venerea p. 38. London, 1824.—Essay on a peculiar Inflammatory Disease of the Eye, by William Wallace; in the Medico-Chirurgical Transactions Vol. xiv. p. 286. London, 1828.

[‡] Essay on Iritis, by the late Geo. C. Monteath, M.D. in the Glasgow Medical Journal, Vol. ii. p. 43. Glasgow, 1829.

"2. Iritis presents itself to our observation much more frequently in what may be called the *second degree*; when the external inflammation of the eye is such as at once to attract attention. Farthest from the cornea, indeed, the sclerotica appears hardly inflamed, the trunks only of the distended blood-vessels being there observable, but on arriving within a few lines of the cornea these trunks divide into innumerable ramifications, so as to form a complete radiated zone, or halo of inflammation. The vessels seem to terminate abruptly, as if sinking through the sclerotica, and never, in this degree of the disease, advance into or over the cornea. The annulus minor, and partially the annulus major, have become discoloured from the injection of the iris with a superabundant quantity of red blood, or perhaps from effusion of lymph into its substance; and this change of colour is apt to be permanent. The anterior surface of the iris, instead of being smooth and shining, now appears dull, puckered, and swoln, particularly near the pupil, which is retracted towards the lens. The pupil is contracted, irregular, motionless, and filled with an effusion of coagulable lymph, which presents an appearance like half-boiled white of egg. Vision is greatly impaired. The intolerance of light and epiphora are considerable. The pain of the eye is pretty constant, and during the night is attended by circumorbital hemicrania. There are present the symptoms of inflammatory fever.

"From such a state of the eye, recovery to a certain extent may take place even without any very methodical treatment. By the use of proper remedies, the inflammation will gradually be subdued, and the effused lymph be absorbed; the contracted pupil will expand, though probably never so completely as to regain its natural size or mobility, and a tolerably fair state of vision will ultimately be recovered. As the symptoms yield, whitish threads of organized lymph will become evident, binding at different points the edge of the pupil to the capsule of the lens. These adhensions are capable of being elongated in time, but never disappear entirely, and necessarily impede the functions of the iris. In other cases, the whole of the edge of the pupil is fringed with lymph, firmly gluing it to the capsule, the centre of which may also be left opaque from lymphatic deposition, in which case the patient sees only through the imperfectly transparent ring left between the central opacity of the capsule, and the fringed edge of the pupil. It sometimes happens in this degree of the disease, that the posterior surface of the annulus minor, which is covered with pigmentum nigrum, having been glued by lymph to the anterior capsule, the proper substance of the iris, as the inflammation subsides, regains, in a considerable measure, its power, and the pupil is enlarged, while the pigmentum nigrum remains adherent to the capsule, and is seen of a black colour fringing the edge of the pupil, and constituting a variety of what has been called *cataracta pigmentosa*.

"3. Iritis, in the *third degree*, presents the following symptoms. The surface of the eye is much more intensely inflamed. The conjunctiva may be so much so, as completely to mask for a time the zonular redress of the sclerotica. Both the annulus minor and major of the iris lose their natural colour. The anterior surface of the iris is puckered, swoln, and bolstered forward so as to approach the cornea, except its pupillary edge, which is retracted towards the capsule of the lens. Red vessels and spots of blood may sometimes be discovered on the surface of the iris, and still more frequently in the lymph which occupies the contracted pupil. On the surface of the iris, one or more minute elevations of a yellowish colour make their appearance, which in some cases are merely spots of effused lymph, but in others prove small abscesses. Pus, discharged from these, with lymph, and blood, occupy the anterior chamber. The cornea becomes turbid, so as to resemble a piece of glass which has been breathed upon, and in some cases is dotted over with minute brownish spots. Vision is completely, and, in general, permanently lost. Flashes of light in the eye are frequently perceived by the patient, proving that the disorganization is extending to the choroid and retina. There is great intolerance of light, and copious lachrymation. The pain of the eye which attends this third degree of iritis, is in general constant and excruciating, and attended with severe nocturnal pain in the eyebrow and round the orbit. When the case is attended by severe and unmitigated pain, especially in syphilitic cases, there is reason to dread the most serious changes in the eye, even abscess of the anterior chamber, extinuation of the sclerotica, and protrusion of the choroid immediately behind the cornea, disorganization of the vitreous humour, and ultimately atrophy of the eyeball.

"In this third degree of iritis, the prognosis must always be unfavourable, for although it sometimes happens that the result is not so fatal to vision as was perhaps anticipated, especially if a proper mode of treatment is promptly had recourse to, yet it is never the case that any thing near to a perfect recovery of the eye takes place, under circumstances such as those now detailed. The inflammation will no doubt subside, the effused lymph and pus will at length be taken up from the anterior chamber, but the pupil will never become entirely clear, nor regain almost any degree of motion. Sometimes no vestige of pupil can be distinguished, so much is the iris changed in form and texture. Most frequently the pupil remains contracted to the size of a pin-hole, through which it sometimes happens that beyond all expectation a considerable share of vision is enjoyed. In most cases, however, so complete a closure of the pupil presents an impenetrable bar to the transmission of light; and, in many instances, from the diseased state of the choroid and retina, not even an artificial opening in the iris can restore vision.

"The distinction of *acute* and *chronic* iritis, is of considerable importance.*

"We meet with the acute disease in robust individuals of full habit, where a powerful cause has acted on the organ, and more especially if the case has been neglected at the commencement, or the cause has continued to act. We find bright external redness, great distention of vessels, rapid and general change of colour in the iris, contraction of the pupil, effusion of lymph, dulness of the cornea, loss of sight, agonizing pain of the eye, severe headach, and considerable fever, with restlessness and want of sleep. In a few days vision is irreparably lost.

"On the other hand, iritis may arise so imperceptibly, and proceed so slowly to effusion of lymph, to diminution or even loss of sight, that no pain is felt in the part, and scarcely any redness takes place. No alteration is observed by others, and sometimes not even by the patient, who has been known to discover the disease accidentally on shutting the sound eye, and finding the vision of the other gone.

"Inflammation more readily extends to the rest of the organ in acute cases, yet this extension may equally occur when the disease is chronic. The prognosis must be drawn from a combined consideration of the time the affection has lasted, the cause upon which it depends, and the visible effects already produced. Irreparable injury to the organ may occur in a few days, when the inflammation is acute. A fortnight, three weeks, or a month, may elapse when it is of ordinary severity, without any serious mischief; while a still longer duration does not preclude the expectation of recovery in the most chronic form of the complaint.

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* Lawrence's Lectures in the Lancet. Vol. x. p. 257. London, 1826.

"*Sequelæ.*—The most striking sequelæ of iritis, are the changes which the pupil undergoes in consequence of this disease, and which are often of a permanent kind. *Atresia iridis* or contraction of the pupil, and *cataracta lymphatica,* or false cataract, are the sequelæ of greatest importance.

"The inflammatory symptoms, to whatever degree of violence they may have reached, after an indefinate period begin to abate. If pus and blood have been effused into the anterior chamber, they are gradually absorbed; if an abscess has formed on the surface of the iris, the shreds of the cyst, which for a time hang floating in the aqueous humour, at length disappear; and the anterior chamber regains its transparency. In many cases, the iris remains permanently expanded, and its motions completely annihilated. Its greater circle may in some measure resume its natural colour, but the lesser continues permanently discoloured. The puckered appearance of the iris remains. The pupil is almost completely closed, and filled up by an ash-coloured membrane. The power of vision is entirely lost. This state is called by Schmidt, *atresia iridis completa.*

"The eye is not always left in so unfavourable a condition. Perhaps there has been no abscess, nor any profuse quantity of effused lymph. When the inflammatory symptoms subside, the iris, though remaining considerably expanded, is found still to possess some degree of mobility, and it is possible that its natural colour may be almost completely restored.—Though the pupil is contracted to a degree less than its medium size, the coagulable lymph by which it is occupied, is reduced to the state of a fine pseudo-membrane, opaque in most instances at its centre, but somewhat transparent, and perhaps reticulated towards its edge. The pupillary margin of the iris does not adhere all round to this pseudo-membrane, but only at some points, the rest being free, and hence the pupil is very irregular, especially when artificially dilated. Vision under these circumstances is impaired, not destroyed. This constitutes *atresia iridis incompleta.*

"In a third set of cases, only part of the iris has been affected with inflammation. When this has gone off, a mere thread of opaque matter remains in the otherwise transparent pupil. By this thread, a single point of the margin of the pupil is kept fixed, while every other part is free and moveable. This is termed *atresia iridis partialis.*

"*Diagnosis.*—The ophthalmiæ with which iritis is apt to be confounded, are rheumatic, and catarrho-rheumatic ophthalmiæ, corneitis, aquo-capsulitis, inflammation of the chrystalline capsule, and retinitis.

"1. Rheumatic ophthalmia, catarrho-rheumatic ophthalmia, and rheumatic iritis, are three diseases which merge into one another. A degree of iritis almost invariably attends the two former inflammations. Exactly as in many cases of catarrho-rheumatic ophthalmia, it is difficult to say whether the disease affects the conjunctive more, or the sclerotica, so it is often doubtful whether we should set down some cases of pure internal ophthalmia which we meet with, as examples of sclerotitis or of irritis.

"2. Although there are present in corneitis a sclerotic zone of inflammation, dimness of vision, and supra-orbital pain, as in iritis, still an attentive examination of the state of the cornea itself will easily enable us to distinguish the one from the other. The cornea is generally much more opaque in corneitis than it ever becomes in any case of iritis, the opacity is speckled and streaked in a peculiar manner, and partially covered by the ramifications of red vessels. If through the cornea we observe the pupil moving briskly, according to the various degrees of light to which the eye is exposed, we may conclude that the case is one of pure corneitis; but as has already been mentioned, we meet with cases in which iritis and corneitis are conjoined, and as the cornea is often too dim to permit of the iris itself being distinctly seen, we are obliged to judge of the existence of this combination by the severity of the pain, and the size and mobility of the pupil. The circumorbital pain and the pain in the eye are more severe when both iritis and corneitis are present, than in simple inflammation of the cornea; and the external opacity is rarely such as altogether to prevent us from judging of the state of the pupil. If it be contracted and fixed, iritis is undoubtedly present.

"3. In inflammation of the lining membrane of the cornea or aqueous capsule, there is radiated sclerotitis, seldom, however, surrounding the whole cornea, with dull aching pain in the forehead, so that in these respects there is a resemblance to iritis. The opacities on the internal surface of the cornea are very diagnostic in aquo-capsulitis; they are milky spots producing a peculiar mottled appearance, very unlike any of the common specks of the cornea. In some cases, however, of this disease, there takes place an effusion of coagulable lymph, which mingling with the aqueous humour, may produce an appearance somewhat closer to the symptoms of severe iritis. Indeed it sometimes happens after keratonyxis, or the operation of division of the cataract through the cornea, that iritis occurs in conjunction with aquo-capsulitis.

"4. The disease most resembling iritis is inflammation of the chrystalline capsule, first accurately described by Professer Walther. Partial zonular sclerotitis, discoloured iris, nebulous, contracted, and fixed pupil, and even adhesions between the iris and the capsule, are present in this disease; and yet it appears specifically different from iritis. The pain which attends it is less, it is generally limited to one spot of the capsule, it is slower in its progress than almost any case of iritis ever is, and it is much less under the influence of remedies of any kind. It cannot be denied, however, that inflammation of the chrystalline capsule is always accompanied by some degree of iritis.

"5 Retinitis resembles iritis in the appearance of the external inflammation by which it is attended, and in the closure of the pupil which it speedily produces; but its attack is more sudden, its progress much more rapid, the pain of the head by which it is attended, still more insufferable, while vision, and even the perception of light, are destroyed much earlier, and even before the pupil closes.

"*General Cure of Iritis.*—The chief indications in this disease are—1. To subdue the inflammation. 2. To prevent the effusion of coagulable lymph, or to promote its absorption if already effused. 3. To preserve the pupil entire, or to dilate it, if already contracted.—5. To assuage the attending pain. To fulfil these indications we have recourse to such remedies as the following.

"1. *Bloodletting* must in no case be neglected, and when the patient is robust and the inflammation severe, must be vigorously employed. Local bleeding is by no means adequate to remove iritis even of moderate severity. General bleeding must be premised and repeated till the constitutional irritation is abated. Leeches may then be applied freely round the eye, and repeated every day or every second day, till the inflammation is subdued. Scarification of the conjunctiva is useless, or even hurtful, in iritis.

"2. *Purging*, the use of diuretics, a spare and cool diet, confinement within doors, rest of the whole body, and the shading of both eyes from the light, will be found powerful auxiliaries.

"3. *Antimony*, and other nauseants, prove useful in two ways. They moderate the circulation, and render the system more susceptible of the influence of mercury.

"4. *Opiates* are in general imperiously demanded in iritis, by the severity of the nocturnal circumorbital pain, as well as by the distress which the patient experiences in the eye itself.

"5. *Mercury* given so as to affect the constitution, is a most valuable remedy in iritis.—But subduing the inflammation, it both prevents the effusion of coagulable lymph from the iris; and if that substance is already effused, powerfully promotes its absorption.*

"6. *Turpentine* has lately been recommended as a remedy, which, taken internally in cases of iritis, displays properties analogous to those of mercury.†

"7. *Blisters* behind the ears, or to the nape of the neck, are of material use after sufficient loss of blood.

"8. *Belladonna,* in the first degree of iritis, speedily expands the pupil; in the second and third degrees, it has no apparent effect till the inflammation is considerably subdued by bloodletting and the use of mercury. It ought to be employed in every case and in all stages of the disease. The mode of employing it is in extract, smeared on the eyebrow and upper eyelid every evening. As it is during the night that the disease appears to make most progress, and as during sleep there is a natural closure of the pupil, which must favour the permanent contraction which iritis tends to produce, the evening is evidently the most proper time to apply the belladonna.‡ As soon as the inflammation has subsided in any considerable degree, and the fibres of the iris have become somewhat relieved from the effused lymph, the pupil will begin to expand; and even in neglected cases, where the pupil has been allowed to become almost obliterated, the continued use of belladonna for many months is sometimes attended by a gradual dilatation, and a corresponding improvement in vision. I have already referred to an occasional effect of belladonna, which may perhaps appear to some to afford ground for objecting to its use in the acute stage of iritis, namely, its operation on the proper substance of the iris, so as to dilate the pupil, but at the same time to leave the pigmentum nigrum, or uvea, attached to the capsule of the lens, whence it never afterwards appears to separate. That this tearing of the iris from the uvea does occasionally happen from the influence of belladonna, is, I believe, undeniable. It is, however, a rare occurrence; very rare, if proper means are promptly adopted to subdue the inflammation; more apt to occur if the case is trusted, as some have recommended, to mercury, without bloodletting. After taking away blood, I should never hesitate to apply belladonna.

"The above-mentioned remedies are suited, more or less, to every kind of iritis; but, of course, peculiar modifications in the treatment will be necessary according to the different causes of the disease, whether these be syphilitic, scrofulous, arthritic, or of whatever other nature, and according to the differet symptoms which each species presents.

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* The influence of mercury, alone, or combined with opium, in ophthalmia, has long been generally known. See Warner, Plenck, his plagiarist Rowley, &c.

The following passage shows distinctly that Beer was well acquainted both with the effects of iritis, before Schmidt's work was published; and also with the power of mercury, in preventing effusion of lymph into the pupil. "Es freute mich ungemein, auch hier schon nach *Warner* das Calomel bey der Augenentzundung empfohlen gefunden zu haben; den es giebt gewiss kein wirksameres Mittel gegen die heftigste Phlegmone, und gegen die Gefahr der Eiterung und das Ausschwitzen der Lymphe, als dieses;—versteht sich, wenn die nothigen Blutausleerungen vorausgegangen sind.—Ich unterstute und befordere diese vortrefliche Wirkung in hartnackigen Fallen noch durch aussere Einreibungen des Quecksilbers in der Gegend der Augenbraunen, und sehe seit der Zeit, als ich mich deiser Methode bediene, auch bey der heftigsten Entzundung keine Eiterung, oder keinen Staar vom Ausschwitzen der Lymphe mehr entstehen. Wirklich ein ausserst wichtiger Vortheil fur den Praktiker." Bibliotheca Ophtalmica, Vol. ii. p. 85. Vindobonæ, 1799. See also Vol. i. p 55.

† Observations on the Efficacy of Turpentine in the Venereal and other deep-seated Inflammation of the Eye; by Hugh Carmichael. Dublin, 1829.

‡ London Medical and Physical Journal, Vol. liv. p. 113. London, 1825.

RHEUMATIC IRITIS.

"It has already been mentioned, that attendant on rheumatic and catarrho-rheumatic ophthalmia, there is in general, a degree of iritis; while in the first of these two diseases the chief seat of the inflammation is the sclerotica, and the conjunctiva and sclerotica in the second. There is a third set of cases arising, like the two ophthalmiæ just referred to, from exposure to atmospheric changes, in which the iris is all along the part principally affected, and in which the attack is sudden, in this last respect resembling other diseases caused by external influences, and differing from those, which, originating entirely in some constitutional or internal cause, advance slowly and insidiously. Not unfrequently both eyes are simultaneously affected with this disease, and with nearly equal severity. In other cases, only one eye is inflamed, or the one much more severely than the other.

"*Local Symptoms.*—In rheumatic iritis, changes occur even at the very commencement of the disease, indicative of the peculiar seat of the inflammation. These changes uniformly commence upon the edge of the pupil, whence they extend gradually towards the ciliary circumference of the iris. The pupil is first of all seen to be contracted, the motions of the iris impeded,and the pupillary opening deprived of the bright black colour which it naturally possesses. The colour of the iris is next observed to undergo a change; first, in the lesser circle, which becomes of a darker hue, and afterwards in the greater, which grows green, if it had been greyish or blue, and redish, if it had been brown or black. This change of colour, is a never-failing index of the substance of the iris being inflamed, and, as has already been mentioned, is apt to continue after all the other symptoms of iritis have been subdued. As soon as it is observed to have taken place to a considerable degree in the greater circle, the iris swells, and projects towards the cornea, while the pupillary margin, losing its sharply defined edge, seems somewhat thickened, and is turned back towards the capsule of the lens.

"The redness accompanying these changes, is by no means considerable, and is at first confined to the sclerotic coat, in which a number of very minute rose-red vessels are seen, running in straight lines towards the cornea. By and bye, the redness increases, and is seen to arise partly from vessels developed in the conjunctiva. The vascularity is greatest round the cornea; towards the folds of the conjunctiva, it fades away.

"There is pain in the eye, in many cases severe and pulsative, and increased on motion of the organ; pain in the eye-brow; and circumorbital nocturnal pain, similar to what is met with in rheumatic sclerotitis.

"If the disease is not checked, the pupil is observed to lose its circular form, becoming irregular, and at the same time presenting a greyish appearance. Examined through a magnifying glass of short focus, or even by merely concentrating the rays of light upon the pupil through a double-convex lens, this greyish appearance is seen to be produced by a substance very like a cobweb, which an experienced eye instantly recognises as a delicate flake of coagulable lymph. Into this, the processes or dentations of the irregular pupillary margin of the iris seem to shoot, and it is afterwards found that at these points, adhesions between the iris and capsule are apt to be established. It is owing to these adhesions, that the patient, whose vision has been all along indistinct, sometimes complains of now being able to see only one side, or part of an object.

"The effusion of lymph into the pupil continues to increase. It takes place likewise behind the iris, so that adhesions are formed between the uvea and the capsule of the lens.—The quantity of lymph effused is sometimes so great, as to fall down in a curd-like form, into the anterior chamber.

"By this time, the morbid sensibility to light which prevailed at the commencement of the disease, is diminished: the powers of vision become gradually more and more limited, and at length little more than the perception of light remains. Not unfrequently, the lymph occupying the contracted pupil, gives rise to the sensation of a black spot, like a fly, or of several black or hazy spots, placed as it were at some distance before the eye, and partially intercepting the view of the objects situated before or to one side of the patient.

"As the disease goes on, the cornea loses somewhat of its peculiar brilliancy, and in some cases, very striking changes take place on the anterior surface of the iris. Spots of lymph occasionally form upon it: while, in other cases, lymph appears to be deposited in the substance of the iris, for while it projects more and more towards the cornea, its fibres get collected into bundles, giving to its surface a peculiar plaited or puckered appearance. In some cases, one or more yellowish-red elevations form on the anterior surface of the iris, most frequently about the union of its greater and lesser circles. Small at first, such an elevation gradually enlarges, projects towards the cornea, and is at length distinctly seen to be a cyst containing pus, which, finally bursting, discharges its contents into the anterior chamber and thus gives rise to spurious hypopium. A small quantity of blood is sometimes extravasated at the same time into that cavity.

"Such is the general history of a neglected case of rheumatic iritis. We meet, of course, with many degrees of severity in this disease; while its sequelæ are varied, as has been described in the last section, and more or less detrimental to vision. The inflammation will at length subside, even though no remedies are employed; but, in such cases, vision will in general be lost.

"*Constitutional symptoms.*—Like rheumatic sclerotitis, this inflammation of the iris may attack an individual who has never suffered from rheumatism in any other part of the body. Not unfrequently, however, the subjects of this disease have long been subject to other rheumatic affections, although the iritis appears in every case to be excited by some new exposure to cold, and never, as far as I have seen, to be metastatic. Thirst, whiteness of the tongue, and accelerated pulse attend an attack of rheumatic iritis. The bowels are frequently confined, and there is occasionally a disposition to nausea.

"*Causes.*—These are the same with those already enumerated as producing rheumatic ophthalmia. Some people of confirmed rheumatic habits suffer exceedingly from one or more attacks of this disease every year, each succeeding attack leaving the eye in a worse state, till at length vision is destroyed.

"This iritis frequently occurs during, or after the use of mercury, in consequence of this medicine powerfully predisposing the whole body, to suffer from the exciting causes of rheumatic inflammation.

"*Complication with amaurosis.*—This is a complication by no means of very rare occurrence. It is particularly frequent after typhus fever, a disease, which it is well known, is extremely apt to leave the retina more or less insensible, and the pupil dilated.

"Mr. Wallace has described the complication of amaurosis with iritis after typhus fever, as presenting two distinct stages. During the first stage, there exist amaurotic symptoms alone; in the second, symptoms of inflammation are superadded. The length of time that the amaurotic symptoms continue, before the occurrence of any visible appearance of inflammation, is extremely uncertain, as also the period after fever at which the amaurotic symptoms commence. On many occasions, the amaurotic symptoms, particularly a slight dimness of vision, with muscæ volitantes, have commenced at or even before the time of convalescence from fever, and yet the inflammatory stage has not supervened for weeks or even months; while on other occasions the dimness of vision has not commenced for several days, weeks, or even months, after the febrile attack, and has then been immediately followed by the symptoms of inflammation. Mr. W. never saw a case in which, upon strict inquiry, amaurotic symptoms, more or less strongly marked, had not preceded the inflammatory symptoms.—He also observed that the inflammatory symptoms uniformly subsided a longer or shorter time before the amaurotic symptoms disappeared, and often before they had even diminished in severity.*

"*Treatment.* 1. *Bloodletting.* The degree of synocha which is present in rheumatic iritis, and the effects of depletion on the local symptoms, must guide us as to the extent and kind of bleeding. Repeated venesection is almost always necessary, followed by the liberal application of leeches round the eye.

"2. *Mercury.*—Scarcely is the mouth affected by the use of calomel and opium, when we observe the most marked abatement of the symptoms. It cannot, he denied, however, that unless the patient be careful to avoid new exposure to cold, the mercurial treatment may prove actually more injurious than beneficial. He ought to leave off his usual employment, confine himself within doors, and, if the case is severe, keep his bed. Unless this is done, the disease is apt to recur with redoubled fury, even from such slight causes as changing the head-dress, passing from one room to another, and the like. It is sometimes a question of difficulty, when the patient is poor, and unprovided with proper clothing and shelter, whether we should give mercury at all, unless the patient be admitted into an hospital. We are almost certain by its omission to ruin the eye, and by its exhibition seriously to endanger the general health. The patient's room should be darkened, and have a moderate fire in it in winter. A band of flannel should be constantly worn around the head, and several folds of linen over the eye, to prevent the bad effects of atmospheric changes.

"3. *Turpentine,* as recommended by Mr. Carmichael for syphilitic iritis, may be tried with some hope of success. See next section.

"4. *Rest,* and *the antiphlogistic regimen,* must be strictly enjoined.

"5. *Opiates.*—If we give calomel, we combine it with opium, and exhibit it at bedtime. If we refrain from the internal use of mercury, a powerful opiate ought to be given every night, to assuage the pain. Friction of the head with warm laudanum, is also to be employed, or friction with mercurial ointment containing opium. Should this, along with the opiate taken internally, fail to prevent the nocturnal attack of pain in the eye and round the orbit, considerable relief may be obtained by fomenting the eyelids and parts around with flannel cloths, wrung out of poppy decoction, care being taken to dry the parts well as soon as the fomentation is finished, and then to replace the linen compress, previously heated at the fire.

"6. *Purgatives.*—As much of the sulphate of magnesia as will open the bowels immediately, is to be given every morning.

"7. *Diuretics.*—Small doses of nitre and cream of tartar every two or three hours, are useful.

"8. *Diaphoretics* are of service, but are liable to the same objection as mercury. Unless the patient can protect himself from cold, they ought to be avoided.

"9. *Cinchona* is undoubtedly a remedy of considerable utility in the treatment of rheumatic iritis. I am as much opposed, however, to the idea of trusting to it almost alone, as I am to the plan of confiding solely in the antiphlogistic and sorbefacient powers of mercury in this disease, to the neglect of bloodletting, and other depletory means of cure. In an inflammation of so dangerous a nature as iritis, we should be ready to avail ourselves of every remedy, and never allow ourselves to be beguiled into bad practice, by an affectation of simplicity.

"It is chiefly in the combined cases of amaurosis and iritis after typhus fever, that cinchona has been found useful; and it is upon the iris, more than upon the amaurosis, that it has been found to exercise its beneficial influence. Notwithstanding the strong testimony of Mr. Wallace in favour of commencing the treatment of such cases with cinchona, I confess I am not convinced of the propriety of omitting the use of depletion, and mercury, in such cases of iritis as that gentleman has described. Certainly the disease will not be aggravated by employing these means. Indeed Mr. W: cannot deny the fact, that cases of the very same kind as those which he has recorded, were cured by mercury under the care of Mr. Hewson.* After the acute symptoms are subdued by depletion and mercury, I have no doubt that cinchona, in the form either of bark, or of sulphate of quina, will be found highly useful, not only in the particular variety of iritis which is so apt to follow typhus fever, but in ordinary cases of rheumatic iritis, and especially when the patient is of a strumous constitution. I may here observe, that I am inclined to suspect the existence of lingering congestion in the head, in the cases of combined iritis and amaurosis, which succeed to typhus fever.— In a case of this kind, which I lately treated, I found that little or no effect was produced by repeated leeching, the use of calomel with opium, and the application of belladonna. There was all along slight pain in the eye, with zonular redness, irregular pupil, and dimness of sight. Thirty ounces of blood were taken from the arm. The patient felt immediately easier. The second cupful was observed to be considerably more buffy than the first. Next morning, the pupil was widely dilated in consequence of the action of the belladonna, the redness much less, the pain completely gone, and vision greatly improved.

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* Medico-Chirurgical Transactions, Vol. xiv. p. 294. London, 1828.

"10. *Blisters* behind the ear, on the temple, and on the back of the neck, are of more service in the rheumatic, than in any other iritis. To produce a more moderate degree of counter-irritation, the laudanum with which the head is rubbed, when the nocturnal pain threatens to begin, may be mixed with an equal quantity of tincture of cantharides.

"11. *Belladonna* should be freely applied every evening to the eyebrow and upper eyelid.

"12. *Vinum opii* is serviceable in the decline of this disease. Any other application to the eye itself in the form of collyrium, drop, or salve, is worse than useless.

"*Prevention.*—Those who are subject to rheumatic iritis, must carefully avoid the exciting causes; especially, sudden transitions from heat to cold, violent exercises, crowded assemblies, late hours, card-playing, excess in eating and drinking, and the like. Sea-bathing in summer is sometimes of use in preventing relapses. Removal to a southern climate during the winter, may be the means of saving a patient from his usual attack.

SYPHILITIC IRITIS.

"It is a fact, which places in a striking light the propriety of bestowing a concentrated attention on the diseases of the eye, that while syphilitic ophthalmia remained so little known to many of the most eminent surgeons of this and other countries,† that some of them even doubted its existence, its symptoms and treatment had long been familiar to the ophthalmologists in Germany.

"Like other secondary syphilitic affections, iritis is insidious in its early stage, but after a time rapidly and extensively destructive. If left to itself, it does not fail to disorganize almost every texture of the eyeball, commencing with the iris, and extending its destructive influence to the choroid and retina, the vitreous humour, and even the cornea and sclerotica.

"*Local symptoms.*—The general diagnostic symptoms of iritis, as enumerated at page 422, are in general well marked in the syphilitic species; but it is important to observe, that in the incipient stage, they are sometimes very slight, the syphilitic differing in this respect from the rheumatic iritis, which from the external nature and sudden action of its exciting cause, is generally characterised even from the commencement by signs which can scarcely be overlooked or mistaken. In the syphilitic species, on the other hand, the redness is sometimes for a length of time scattered or fascicular rather than zonular, and the changes in the appearance of the iris and pupil very slight. This shows the necessity, in suspected cases, perhaps I ought to say in *all* cases of iritis, of examining with attention the state of the skin and throat, and inquiring into the history of the patient's previous health. We almost always find the remains of a syphilitic eruption, or sore throat, to attend the accession of syphilitic inflammation of the iris; in many cases, the ophthalmia is coexistent with active secondary symptoms in various textures of the body; and in all instances, the history of the patient's health will throw a degree of light on the affection of the eye, which may be the means of preventing the most disastrous consequences.

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* Hewson's Observations on the History and Treatment of the Ophthalmia accompanying the Secondary Forms of Lues Venerea. p. 109. London, 1824.

† Hunter, Scarpa, B. Bell, Howard, Pearson, &c.

"It is unnecessary to repeat any description of the zonular redness, discolouration of the iris, contraction, irregularity, and immobility of the pupil, effusion of lymph, and other general symptoms of iritis, as they occur in the syphilitic species. In none of these symptoms, nor in the dimness of sight and pain which attend them, is there any thing that I know of, really diagnostic; although some authors have imagined, that they had discovered in some of these symptoms, peculiarities, upon which a diagnosis could be founded. The fact, however, that even directly contrary appearances have been enumerated as diagostic of syphilitic iritis, shews, that to distinguish this species from the rheumatic, something more must be taken into account, than any differences which may be observed in the general symptoms of the disease.

"Beer has described two remarkable local appearances as characteristic of syphilitic iritis; *viz.* displacement of the pupil, and condylomata sprouting from the iris.

"The first of these consists in a gradual movement of the pupil upwards and inwards, so that instead of being placed, as it is in health, nearly in the centre of the iris, it comes to be situated considerably closer to the upper and inner edge of that membrane. This displacement I have seen in chronic rheumatic iritis; and still more frequently in choroditis, unattended by iritis. I cannot regard it, then, as at all diagnostic of syphilitic iritis. That it is occasionally met with in this disease, I have no doubt; but I believe it to be a symptom, not so much of an affection of the iris, as of inflammation of the choroid coat, and pressure on the ciliary or iridal nerves.

"Cysts of a yellowish colour, rising on the surface of the iris, containing pus, bursting, and evacuating their contents into the anterior chamber, are not peculiar to syphilitic iritis, and are different from the tubercles or condylomata described by Beer, as diagnostic of this disease. The latter are of a reddish-brown colour, irregular on their surface, growing frequently from the edge of the pupil, and enlarging sometimes to such a size, as to press the iris backwards, and even to fill the anterior chamber. Beer does not mention that these tubercles suppurate. Dr Monteath supposes that they sometimes form on the posterior surface of the iris, pushing it forwards, and forcing a passage between its fibres, into the anterior chamber. They occasionally continue after all the other symptoms have disappeared.

"If syphilitic iritis is neglected, not only is the pupil speedily closed, and bound down to the capsule of the lens by effused lymph, but the iris is remarkably changed in its appearance, much more so than in any other species of this disease. The cornea, also, becomes hazy, and sometimes dotted over with minute brown spots. The anterior chamber becomes less in size, from the iris being pushed forwards, and at length, from the cornea shrinking in diameter. The sclerotica, choroid, and retina, all partake in the inflammation; the retina becoming insensible to light, while the choroid protrudes, here and there, of a deep bluish colour, through the extenuated sclerotica. The lens and virteous humour are also disorganized, being converted into a pultaceous mass, which may at last be observed forming whitish projecting points through the choroid and sclerotica. From such a state of disease, it is impossible for the eye to recover, so as to preserve its natural form. Neither do we find that puncturing the eye, in such a state, affords any relief to the pain which the patient suffers; it is not from any collection of purulent fluid that the appearance above mentioned arises, and nothing is discharged on passing the lancet through the tunics. If the system is brought under the action of mercury, the eye will, under these circumstances, shrink to a small size; but if this is not done, or if an insufficient quantity of mercury be given, the sclerotica may give way, and a fungous excrescence protrude. At last, from the severity of the pain in the eye and head, the inefficacy of opiates, the fever and debility which are induced, and the unseemliness of the disorganized organ, we shall be oliged to remove it with the knife.

"The degrees of syphilitic iritis, and its sequelæ, are of course, very various. In some cases, it is attended by amaurosis, and then the pupil is enlarged beyond the medium size. Sometimes the pupil is dilated to twice its natural diameter, the centre remaining black, while its edge is surrounded by condylomata. In such cases, though part of the pupil is pretty clear, the patient sees little or none on account of the insensible state of the retina; yet, from this state, the eye may completely recover, by appropriate treatment. The terminations of the disease, if not counteracted by an early employment of mercury, are generally such as have been described under the *third degree;* viz. closure of the pupil, obliteration of the anterior and posterior chambers, and perhaps even general disorganization and sinking of the eye-ball.* Very differently from what happens in neglected rheumatic iritis, the inflammation in syphilitic iritis does not wear itself out, and end in simple loss of vision by closure of the pupil, but goes on from one texture of the eye to another, till the whole are involved in a process of disorganization, which leaves scarcely a trace of natural structure

"The pain which attends syphilitic iritis is very various in severity. In general, it is considerable both in the eye and round the orbit; and, like syphilitic pains in the bones, greatly aggravated during the night.

"*Constitutional symptoms.* This disease is generally accompanied by very evident manifestations of syphilitic cachexia. The pulse is quick, the general strength impaired, the appetite lost, the countenance pale or sallow, and the skin covered, especially during the night, with a clammy perspiration. The local secondary symptoms, with which I have most frequently found syphilitic iritis associated, have been pustular and scaly eruptions on the face and over the body, and next to these, sore throat. The pustules on the face, which I have met with as attendants on syphilitic iritis, have frequently been large, hard, and seated so deeply in the skin, as almost to deserve the name of tubercles. The scaly eruptions on the face have occasionally presented an approach to the areolar form of lepra. Over the body, again, where the eruption has generally been of a more acute character, the appearance has been that of numerous circular elevated spots, of a brownish-red colour, about the size of a split pea, ending in a desquamation of thin successive pellicles of cuticle. Some might perhaps be disposed to consider this last as a pseudo syphilitic eruption

Exciting Causes. Although this disease is unquestionably an effect of the constitution being contaminated by syphilis, and although it commences, in many cases, without any known exciting cause, yet it not unfrequently happens, that, like other secondary symptoms of syphilis, and especially sore throat, it arises from exposure to cold. Slight blows on the eye, and over-exertion of the organ, seem in other instances to aid in bringing on this disease, which therefore may be regarded, at least in many cases, as an effect of certain external causes operating on a constitution imbued with a morbid poison.

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* See page 425.

"*Relapses*. Even when syphilitic iritis terminates in the most favourable manner, the eye, for a long time afterwards, is peculiarly sensible to the influence of cold and moisture. On every exposure to these, the sclerotic circle of inflammation may be observed to return, the light is felt to be disagreeable, and the eye discharges a superabundant quantity of tears. For the same reason, the formation of an artificial pupil, when this is required from the effects of previous syphilitic iritis is generally followed by such a degree of renewed inflammation, as to frustrate the attempt to restore vision.

"*Treatment*. 1. *Blood-letting* is rarely necessary in syphilitic iritis, and by most authors, appears to be altogether discarded. Depletion of any kind is, no doubt, insufficient to cure this disease, which, besides, is, in most cases, unattended by that degree and kind of constitutional irritation which demands the use of the lancet. Still, the local symptoms, and especially the circumorbital pain, may be greatly relieved by the application of leeches round the eye, preceded in robust individuals, by venesection. Dr. Monteath's testimony on this point, is valuable. "Judging from my own experience," says he, "I differ decidedly from those who put their whole faith in mercury in the cure of this species, to the exclusion of the other remedies, such as bleeding, blistering, &c. In my own practice, I have seen the disease running on with rapid strides to dangerous hypopion, notwithstanding the full action of mercury, and its further progress at once arrested by a full bleeding from the arm, and a blister on the hind head."

"2. *Opiate frictions* round the orbit are carefully to be employed about an hour before the nightly attack of pain is expected; after which, the eye is to be covered with a fold of linen, warmed at the fire. Should the pain threaten to come on about midnight, as it is very apt to do, or at any other time during the day or night, the opiate friction ought to be repeated. Laudanum, an infusion of extract of belladonna in laudanum, a mixture laudanum with tincture of cantharides, moistened opium, or opiate mercurial ointment, will be selected for this purpose, according to the circumstances of the case, and the fancy of the practitioner.

"3. *Nauseants*, *sudorifics*, *diuretics*, *purgatives*, and *counter-irritation by blisters*, have each their use in syphilitic iritis, but are of greatly inferior importance to the remedy next to be mentioned.

"4. *Mercury*. Upon this medicine we place our chief reliance for arresting syphilitic inflammation of the iris, and removing the morbid changes which may have already been produced in that membrane, and in the pupil. It is not an alterative course of mercury, however, which must be depended on. The constitution must be thoroughly mercurialized, and the mouth made distinctly sore. The combination of calomel with opium, is the best form for exhibiting mercury in this disease. A pill, containing two grains of the former, with from half a grain to a grain of the latter, may be given morning, noon, and night, till the gums begin to be affected; after which, two pills daily may be continued for some time; and when the mercurialization is more advanced, one at bedtime only. This is the plan to be followed in severe cases, where it is important instantly to arrest the progress of the disease, prevent deposition of lymph into the pupil, or procure its absorption, if already effused. In milder cases, we may trust to a pill morning and evening from the beginning.

"Other forms of mercury have been employed in the cure of this disease, especially inunction round the eye, and corrosive sublimate taken internally. But neither of these can be relied on when the symptoms are urgent, and in all circumstances they are greatly inferior to calomel and opium. The soothing and dirigent effects of the opium are of no small importance.

"Mercury, in one form or other, will require to be continued for a considerable length of ime, that not only the iritis may be arrested, and its effects removed, as far as this is practicable, but that the constitutional syphilis also may be completely cured. A removal of the iritis must not be depended on as a proof of the constitution being freed of the syphilitic virus; while, on the other hand, a removal of the constitutional disease, in many cases, is or appears to be effected, although there remains much to be done, and that chiefly by the operation of mercury, before the eye is freed from the iritis and its consequences.

"5. *Turpentine* has been recommended by Mr. Hugh Carmichæl of Dublin, in syphilitic iritis, and other deep-seated inflammations of the eye. The cases which he has related in his interesting pamphlet, afford, I think, indubitable evidence that this medicine has occasionally removed that species of iritis which is considered as syphilitic; and even after lymph has been effused into the pupil, and condylomata risen on the surface of the iris, has restored these parts to their perfectly healthy state. It was from the acknowledged influence of turpentine in peritonitis, and the analogy in point of morbid effects between inflammation of the peritoneum and that of the iris, in both cases a serous membrane being engaged, and in both, adhesions being produced between surfaces intended to be free, that Mr. C. was led to make use of turpentine in iritis. The results were such as to confirm the idea he had formed. As it is in syphilitic cases chiefly, that he has found turpentine useful, he is well aware of the objection likely to be started by some, that this medicine has never been known to posses any anti-syphilitic virtues. To this, he might have effectively replied, by an appeal to the non-mercurial treatment of syphilis, and to the overpowering testimony of the facts which he himself has recorded. He seems at first disposed, however, rather to chime in with the scepticism of Mr. Travers, who is at a loss to determine whether what is generally considered as syphilitic iritis, is actually a venereal inflammation, or a symptom which merely resembles syphilis, or a disease ingrafted on the syphilitic, or an effect produced by the poison of mercury. But in a more advanced part of his inquiry, Mr. C. declares in favour of the doctrine, that mercury operates in the favourable manner in which it is universally acknowledged to do in syphililic iritis, not so much by means of any peculiar anti-syphilitic property which it possesses, as in consequence of its power to excite the action of the absorbents, and this same sorbefacient power he claims for the oil of turpentine. This claim is abundantly vindicated by the cases which Mr. C. has related; and not only so, but he has also demonstrated that this medicine possesses a controlling power over the inflammatory process, upon which the effusion of lymph, in syphilitic iriti , depends.

"Although Mr. Carmichæl has the merit of having brought forward a new medicine in syphilitic iritis, of unquestionable utility, he is by no means blind to the virtues of other remedies. He acknowledges, that the same antiphlogistic and sorbefacient effects which he has derived from turpentine, may be produced in a more decided manner, by mercury; while he very properly urges, that the rapidity with which turpentine pervades the body, and consequently brings disease under its influence, together with the absence of fever attending its operation on the constitution, must render its use a matter of interest and utility, though the same effects might be accomplished by other means, and even in a more decided manner. Cases of syphilitic iritis occasionally occur, where, from a variety of circumstances, the administration of mercury is, for the time, altogether inadmissible, or at least, extremely hazardous. How fortunate then will it be, if an efficient substitute for mercury be found in the medicine proposed by Mr. Carmichæl!

"The dose of oil of turpentine is a drachm thrice a day Its disagreeable flavour, and nauseating effects, may be obviated by giving it in the form of emulsion. If it induces strangury, lint-seed tea and camphor julep may be administered, or its use suspended for a time. The tendency to heartburn, which it sometimes causes, may be prevented by an addition of ten or fifteen grains of carbonate of soda to the eight ounce emulsion, containing an ounce of turpentine.

When the local inflammation is high, and acute pain is present in the eye and side of the head, abstraction of blood ought by no means to be neglected, notwithstanding the statement of Mr. C. that he has frequently, even when these symptoms were urgent, relied solely on the turpentine mixture, and reaped from it the most decided and expeditious relief. The condition of the bowels will also require attention; the beneficial effects of the turpentine appearing to be suspended when constipation is present, and again called forth when this is removed. Perfect rest, too, if not absolutely necessary, will be found highly conducive to the complete production of the salutary effects of the turpentine. Mr. C. states, that in a few patients, who, from their particular situations in life, were obliged to continue in active employment, the same satisfactory results did not follow its exhibition, nor was its influence fully established, until this was attended to.

"In some of the cases given by Mr. C. sedatives were employed along with turpentine; such as opium, henbane, and cicuta. These may be exhibited, both internally and externally; and of course, the application of belladonna ought not to be omitted.

"Mr. C. states, that the administration of turpentine has very seldom failed in effecting a perfect cure of syphilitic iritis, and that an amendment has generally been quite perceptible the day after it was commenced. The average period of cure seems in his hands to have been about eleven days.

"6. *Belladonna* is to be smeared liberally on the eyebrow and forehead, every night at bedtime. This remedy ought to be continued regularly for months, unless the pupil has completely regained its natural freedom and mobility.

PSEUDO-SYPHILITIC IRITIS.

"It is generally admitted that there are various diseases, either communicated by impure venereal intercourse, or arising in the system without any communication of that sort, which present a series of morbid phenomena, milder and more rapid in general, but still in many respects, similar to those of syphilis. Till a more accurate description of the diseases in question be obtained, we may be allowed to speak of them as syphiloid or pseudo-syphilitic.

"The pustular eruption spoken of by Bateman, under the name of *ecthyma cachecticum*, appears to be one of the disorders apt to be confounded with true syphilis; and there is no doubt that it occasionally affects the iris, in a manner closely resembling the iritis we have just been considering.

"This disease occurs, Dr. Bateman tells us, in connexion with a state of cachexia, apparently indicative of the operation of a morbid poison. It much resembles some of the secondary symptoms of syphilis, and is often treated as syphilitic, although there can be no doubt that it originates frequently, if not always, from derangement of the general health, independent of any thing like infection.

"It generally commences with a febrile paroxysm, which is sometimes considerable. In the course of two or three days, numerous scattered pustules appear, with a hard inflamed base, on the breast and extremeties; and these are multiplied, day after day, by a succession of similar pustules, which continue to rise and decline for several weeks, until the skin is thickly studded with the eruption, under various phases. For, as the successive pustules, go through their stages of inflammation, suppuration, scabbing, and desquamation, at similar periods after their rise, they are necessarily seen under all these conditions at the same time; the rising pustules exhibiting a bright red hue at the base, which changes to a purple or chocolate tinge as the inflammation declines, and the little laminated scabs form upon their tops. When these fall off, a dark stain is left upon the site of the pustules. The eruption is sometimes confined to the extremeties, but it frequently extends also over the trunk, face, and scalp.

" The febrile symptoms are diminished, but not removed, on the appearance of the eruption; for a constant hectic continues during the progress of the disease. It is accompanied by great langour, and much depression, both of the spirits and muscular strength; by headach, and pains of the limbs; and by restlessness and impaired digestion, with irregularty of the bowels. There is commonly some degree of conjunctivitis, and the fauces are the seat of slow inflammation, accompanied by superficial ulcerations.

" This disease is stated by Bateman to continue from two to four months, in the course of which time, by the aid of vegetable tonics, cinchona, sarsaparilla, serpentaria, &c. with antimonials, and the warm bath, the constitution gradually throws off the morbid condition which gives rise to it. He adds that the administration of mercury is neither necessary to its cure, nor appears to accelerate recovery.*

" Dr. Monteath tells us that the resemblance of the iritis produced by this eruption to that which is the consequence of syphilis, is so striking, that for several years of his practice he invariably treated the cases he met with, and successfully, by the free use of mercury, believing them to be syphilitic. " The small circle of the iris, and the border of the pupil," adds he, " are often studded with the small reddish-yellow papulæ or pustules, so characteristic of the venereal iritis. It was in consequence of several such cases applying to me with the disease evidently declining, and the pupil clearing, after two or three weeks' continuance, without the patient having taken one grain of mercury, sometimes almost without any treatment that could have been useful, that I first saw my error, and felt satisfied that these cases were not syphilitic."†

" Notwithstanding the possibility of this iritis being cured without mercury, and the fact that it is occasionally aggravated‡ by an attempt to mercurialize the system, still an alterative course of this medicine is to be omitted, neither in this nor in any of the other pseudo-syphilitic varieties of iritis. They will in general yield to such a course, aided by sarsaparilla, local bleeding, blisters behind the ears, the application of belladonna to the eyebrow, a mild diet, quietude of the general frame and of the inflamed organ. Turpentine, as recommended by Mr. Carmichæl for syphilitic iritis, is worthy of a trial in the pseudo-syphilitic. Among the pseudo-syphilitic varieties of iritis, I include that which sometimes follow gonorhœa.

SCROFULOUS IRITIS.

" Notwithstanding the great frequency of scrofulous affections of the external parts of the organ of vision the iris is rarely the seat of *primary* scrofulous inflammation, although a *secondary* scrofulous iritis is by no means uncommon. We call it *secondary*, not only because in the cases alluded to, inflammation of the cornea is the usual precursor of any affection of the iris, but because the iritis appears to arise more in consequence of the continuance of corneitis, and the spread of inflammation from one texture of the eye to another, than from any new external or internal cause operating on the iris itself.* Cold, however, affectig an scrofulous subject, occasionally brings on a mixed or compound ophthalmia, partly phlyctenular, partly iritic; or at least, we meet with instances in which inflammation of the latter sort so quickly supervenes to the former, that we may regard them as affording examples of *primary* scrofulous iritis. Such cases I have met with repeatedly, they are by no means so frequent as the *secondary* scrofulous iritis attendant on corneitis.

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* Practical Synopsis of Cutaneous Diseases, page 187. London, 1819.

† Glasgow Medical Journal, Vol. ii. p. 138. Glasgow, 1829.

‡ See a case which occurred in the practice of Mr. Arnott, related in the Quarterly Journal of Foreign Medicine and Surgery, Vol, i. p. 78. London, 1819.

The following case quoted by Dr. Monteath from the journals of the Eye Infirmary, affords a good illustration of what I am disposed to call *primary* scrofulous iritis.

"Robert Fleminster, aged 16, applied on the 5th August, 1827, with sclerotitis and iritis of the left eye, which had resisted remedies for a month. Six leeches were applied to the temple. and he was put on two grains of calomel with a quarter of a grain of opium, morning and evening. In eight days the inflammation was gone, and the sight restored nearly to its natural state. On the 17th he was dismissed cured. Iritis being of rare occurrence in children, Dr. M. suspected this case, and pointed it out as probably strumous. What occurred in the other eye, proved the suspicion to be just; for on the 24th he was admitted for an attack of distinct external strumous inflammation of the other eye, with pustules and an ulcer at the border of the cornea. The solution of nitras argenti was had recourse to, two leeches were applied to the temple, and a blister behind the ear, and he was directed to bathe the eye with a very weak solution of corrosive sublimate. On the 27th he was no better, and the colour of the iris was observed to be changed. It was now evident that the inflamation would become iritic, as it had done in the other eye. Four leeches were, therefore, applied to the temple, and the pills of calomel and opium commenced again, as before. On the 31st the inflammation appeared still advancing, and the iris becoming more affected. The leeches were repeated, and the calomel with opium continued. In five days after this, the mouth was sore, and inflammation nearly gone. The mercury was now omitted; and, on the 14th, he was dismissed perfectly cured.

"This, then, was well-marked case of acute, and I think we may say *primary*, strumous iritis. The redness with which it yielded to appropriate treatment is worthy of attention. Had the treatment been improper or inefficient, the boy must have lost his sight. Whenever iritis is observed in a very young person, struma may be suspected as the predisposing cause; the other species of iritic inflammation being rare in childhood. The treatment must be such as was employed in the case just quoted; that is to say, in addition to the treatment demanded by strumous ophthalmia, calomel and opium must be given till the mouth is affected. The pupil also ought to be kept under the influence of belladonna.

"The same plan must be followed in cases of *secondary* iritis accompanying strumous corneitis. I have already hinted, in pages 419 and 425, at the dificulty of discerning, through the inflamed cornea, the exact state of the iris and pupil. Several of the symptoms, also, which attended strumous corneitis and iritis, are of an equivocal sort, for the zonular inflammation of the sclerotica, the supra-orbital or circumorbital pain, and the impaired state of vision, are common to iritis and corneitis in their separate state, as well as when they exist together. When the opacity of the cornea is not very great, we shall be able, however, to discern at least the size, and degree of mobility, possessed by the pupil. If the aperture is contracted, irregular, and motionless, there can be no question but that severe iritis is or has been present. But in many cases, by concentrating the light upon the cornea through a double-convex lens, we may observe even the discolouration of the iris, and the whitish cobweb of effused lymph occupying the pupil.

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* See page 419.

"Neglected cases of this compound ophthalmia are frequently met with, in which, from the low state of the inflammation and slightness of the pain, the disease has been allowed to go on for years, till at last vision has become almost extinct. A remarkable circumstance in such neglected cases is the great degree of softness or bogginess which both the cornea and the sclerotica present, on being pressed with the finger. This I regard as a very unfavourable sign; denoting in fact a disorganization of the vitreous humour, always attended by a considerable degree of amaurosis.

"Whenever iritis is observed to coexist with strumous corneitis, an attempt must be made, by mercury and belladonna, to counteract the narrowed state of the pupil, and effusion of lymph from the iris. From the peculiar constitution of the subjects of this iritis, as well as the chronic nature of the disease, the administration of mercury must be conducted with more than ordinary caution and patience; the gums will in the first instance require to be decidedly affected, after which repeated gentle courses of the medicine will be necessary, while the system must be supported during the intervals, by nourishing diet and the use of tonics. Turpentine has not been tried in scrofulous iritis.

"We must beware of employing stimulants, with the view of clearing the cornea, so long as there is any suspicion of active inflammation being present in the iris; else we may readily bring on such a degree of irritation, as shall end in annihilation of the anterior chamber, and of course in irreparable loss of sight.

ARTHRITIC IRITIS.

"The disease decribed by the German ophthalmologists under the name of arthritic iritis, is known by many remarkable characters, and is unquestionably connected with a peculiar state of the constitution. I have often been led to doubt whether it be in reality a purely gouty inflammation; and even now, I am not altogether decided as to this point. In this country, however, we do not very frequently meet with those affections of the eyes which the Germans have designated as arthritic, and to decide on a question of this sort, except after ample experience and careful observation, would be absurd. Dr. Monteath, who had paid great attention to the diagnosis of eye-diseases, appears to have been fully convinced of the justness of the views entertained in Germany regarding arthritic diseases of this organ. There is one thing to be considered, that in this country, gout is a disease very rarely met with in any form, except among the opulent and luxurious; while in the wine countries of the continent of Europe, and especially in Austria, where wine is the beverage of all ranks, gout, is common even among the poorest of the people.

Arthritic iritis originates in two ways. In one case, it is the primary and sole affection of the eye; in another, an individual of arthritic constitution being affected with some common ophthalmia, as rheumatic, catarrho-rheumatic, or traumatic, this degenerates into the arthritic. The same thing occasionally happens in regard to syphilitic iritis. The arthritic originates more frequently in this way than in the other.

Symptoms. The general symptoms of iritis are present in the arthritic species; namely, zonular sclerotitis, discolouration of the iris, turbidness of the pupil, with changes in its shape, size, and mobility, impaired vision, and pain in and around the eye. These symptoms, however, are modified in such a manner as to afford ground for a ready diagnosis.

1. *Redness.* The conjunctiva is loaded with enlarged vessels as well as the sclerotica. The redness is of a purplish hue; and what is strongly insisted on as a diagnostic mark of arthritic iritis, the inflamed vessels are stopped abruptly before reaching the edge of the cornea by a narrow ring of a bluish-white colour. This ring sometimes does not occur, particularly at the commencement of the disease, all round the cornea, but only at its temporal

and nasal sides. The visible arteries of the eye, derived from the recti muscles, show from the very first a strong disposition to become varicose, and at length are so strikingly dilated as to form another characteristic symptom of arthritic iritis. The sclerotica loses its natural appearance, and becomes of a dirty greyish violet colour. Most of these appearances, and especially the livid colour and varicose dilatation of the blood vessels, are regarded as indicative of a great tendency to atony, which may account for this variety of iritis being much less amenable to antiphlogistic treatment than the others.

"2. *Changes of the iris and pupil.* Beer has described these as varying in two different habits of body. In those who are of a meagre and irritable habit, and tense fibre, the pupil contracts, is filled with effused lymph, and becomes adherent to the capsule, as is generally the case in the other species of iritis. In such cases, the only characteristic symptom, besides the white ring round the cornea, is a varicose state of the blood vessels of the iris, so that after the disease has fully developed itself, they may be discerned ramifyingon the surface of that membrane or, forming a vascular wreath within the verge of the contracted pupil, Before it arrives at this stage, the inflammation is always attended with general fever. If the eye is left to itself, it does not suppurate, but its contents begin to be absorded, and at last its volume is extremely diminished.

"In those again, who are of a gross habit of body, possess little sensibility, and have a lax fibre, the iris instead of expanding, contracts remarkably, a sign of attending amaurosis, and at the same time loses its motion and natural black colour. The pupil is not always dilated uniformly along its whole circumference; not unfrequently the iris contracts more towards the temporal and nasal sides of the eye, so that the pupil assumes an oval shape; indeed, the iris sometimes becomes so narrow on the two sides mentioned, especially on the temporal, as almost to disappear. Along with these changes, there is no effusion of lymph, nor any abscess on the surface of the iris. Behind the enlarged pupil, there is perceived the greyish-green reflection, characteristic of glaucoma, a state of the eye depending on absorption of the pigmentum nigrum. with dissolution of the vitreous humour, and occasionally accompanied by discolouration of the lens. After a time, the lens is plainly seen to have lost its transparency, and to have assumed an opaque sea-green colour: it swells considerably, and projects through the pupil, into the anterior chamber. The iris, lying upon the enlarged lens, seems much altered from its natural texture; it looks soft, and as if it had undergone a degree of maceration. The varicose state of the vessels of the conjunctiva increases, while those of the choroid becoming similarly affected, from bluish knots, which shine through the sclerotica. The anterior part of this tunic being extenuated by the pressure of the morbid parts within, a dark ring shines through it, exactly occupying the situation of the corpus ciliare. Vision is by this time totally gone. The inflammatory symptoms now begin to decrease, and absorption of the contents of the eyeball follows as in the former instance. In either case, if both eyes are not simultaneously attacked, the same process attacks the one eye after the other, and follows a similar course till both are destroyed.

"3. *Pain.* It sometimes happens that before any other signs of arthritic ophthalmia make their appearance, the patient is troubled with peculiar tingling sensations about the eye, and a feeling of creeping over the skin of the face. The eye and the orbit soon become the seat of racking pain, extending to the temple, and shooting down into the jaws. During the progress of the changes of structure above detailed, the attacks of pain are regular and very severe, greatly aggravated in general towards midnight, but in some cases suffering little abatement at any period of the twenty-four hours The patient is warned of their approach, by a stinging sensation all round the eye, followed by an increasing flow of tears;

after which, the pain sets in, and becomes, in many instances, so extremely violent, that the patient is forced to writhe under it, and utter the most piercing cries of distress.

"4. *Secretion from eyelids.* The epiphora which attends arthritic inflammation of the iris, leads to frequent opening and shutting of the eyelids, by means of which there is forced out from between them, a peculiar white frothy matter, which Beer regarded as diagnostic of arthritic ophthalmia, and which is easily distinguished from any of the ordinary secretions of the conjunctiva or Meibomian follicles. On examining this foam or froth, it appears to consist of extremely minute globules of watery fluid.

"*Constitutional symptoms.* The subjects of arthritic iritis will be found, I believe, to have suffered much more frequently from the symptoms of irregular than of regular gout. They will present, in general, that combination of plethora with debility, which is so characteristic of the gouty constitution, and will be found to have long been the victims of a variety of affections of the stomach, such as nausea, vomiting, flatulency, acid eructations, and pains in the epigastrium. Irregular bowels, pains and cramps in different parts of the trunk and extremities, headaches, giddiness, an eruption of suppurating tubercles on the face, with lowness of spirits, will also be found to have prevailed more or less, in those who are attacked by this species of opthalmia. One of the worst cases I have seen, was in a person who, without being a drunkard, had for many years laboured under a great degree of gutta rosacea. An erroneous plan of diet, and especially an indulgence in alcoholic fluids and tobacco, will in general be found to have been followed by those who suffer from this iritis.

"*Prognosis.* This is more unfavourable than in any of the other species of iritis. A first attack may continue for many months, and though at last the symptoms may yield, and a tolerable degree of vision be saved, a renewal of the disease is always to be dreaded, owing to the extreme difficulty, not to say impossibility, of removing the arthritic disposition. Besides its obstinacy, there is another circumstance connected with arthritic inflammation of the eye, which renders the prognosis peculiarly unfavourable, namely, the strong, tendency which the disease has to affect the choroid, retina, and humourous, so that though the attack may for several successive times be iritic, the rest of the eyeball becomes at length implicated and destroyed.

"*Cure.* The three most important indications are, 1st, To remove the inflammation, 2d, To subdue the pain, and, 3d, To prvent relapses.

1st, Though inflammation be, as Dr. Monteath has well remarked, the proximate cause of all the evils in this species of iritis, as in the traumatic or any other, yet, as it is of an unsound and peculiar nature, and dependent on a constitutional cause, it cannot be eradicated by the vigorous use of mere antiphlogistic means. General bleeding is seldom advisable in arthritic iritis, and may even aggravate the subsequent course of the disease. Even local bleeding, by cupping and leeches, must be cautiously employed. Except in sanguineous and plethoric habits, and sometimes even in them, blood-letting in this disease will often disappoint our hopes, especially in eldery people, and instead of alleviating the symptoms, rather increase the feverish irritation and restlessness. If we venture on general bleeding, the quantity drawn at once should not exceed ten or twelve ounces, If necessary, this quantity may again be taken away in twelve or twenty-four hours. In most cases, however, the application of leeches to the temple, forehead, and eyelids, besides its local effect, produces all the benefit which is to be derived from the evacuation of blood.

"The bowels ought to be freely opened by one or more smart doses of calomel and colocynth, followed after some hours by salts and senna. If the tongue still continues foul and the mouth bitter, a common dose of ipecacuan and tartar emetic may be of much service. After this, the bowels are to be kept open by laxatives, and the skin excited to moisture by some mild diaphoretic.

"The free use of mercury is as unsuitable in arthritic iritis as profuse blood letting. Any alterative course of this medicine, however, will be of much service, and may be continued for weeks or moths, along with other suitable remedies, so as to change the vitiated habits of the digestive organs. To arrest the morbid action of the capillaries, and check the effusion of lymph, in this iritis, by the sudden introduction of mercury, as in other species of this disease, has been found impracticable. Whether any better effects are to be derived from turpentine, as recommended by Mr Carmichæl, future experience must determine.

"I have sometimes derived very stricking benefit from the use of the precipitated carbonate of iron, in arthritic ophthalmia, after depletion and mercury had been employed without relief. Sulphate of quina is another remedy which might be tried with some hope of success.

"Counter-irritation, by blistering and otherwise, is of great service. Beer particularly recommends the bringing out of an artificial eruption by means of tartar emetic ointment.

"Dry warmth, applied by means of several folds of old linen, heated at the fire, hung over the eye, and renewed frequently, is the only direct application to the inflamed organ which can at all times be used with impunity. It promotes an increase of the insensible perspiration, and in this way is of much use. Cold applications uniformly do harm; and even hot fomentations, with popy decoction and the like, are not always safe, especially if the parts are left wet and exposed after their application.

"2d, To moderate and remove as quickly as possible the periodical fits of pain, is a matter of great importance. For this purpose, Beer recommends simply opium, moistened to the consistence of a liniment, to be rubbed in, round the orbit. Mercurial ointment with opium and extract of belladonna, or volatile liniment with laudanum, may be used for the same purpose. The friction is to be performed when the evening paroxysm is expected to recur, and repeated during the night if the pain is not prevented, or should threaten to return at any period of the day or night. The internal use of opium ought if possible to be avoided, on account of the disordered state of the digestive organs. Should the pain, however, become very urgent, it ought not to be withheld. Considerable relief may also be obtained from the internal use of stramonium, hyosciamus, belladonna, colchicum, and prussic acid, none of which have the same bad effects on the liver and bowels as opium. I have found a vinous solution of murias hydrargyri with belladonna, a convenient form for exhibiting the latter medicine as a sedative, and the former as an alterative, in this disease. The causes which seem to produce accessions of pain must be carefully avoided; as, agitation of mind, sudden changes of temperature, &c.

"3d. Relapses are to be warded off, partly by constitutional, partly by local means.

"The constitutional preventive means are partly medicinal, but chiefly detectical. The general health must be confirmed as much as possible, by proper management of the digestive organs, the kidneys, and the skin. A temperate diet, careful regulation of the bowels by gentle aperients, and a free action of the kidneys, promoted by the use of magnesia or soda water, or of some mild, aperient, and diuretic mineral water will be of much benefit. Daily tepid sponging of the body, followed by dry friction, will be of service by promoting an abundant secretion from the skin. The patient should breathe pure country air, and, carefully avoiding either to overheat or cool himself too quickly should engage in regular and continued exercise of various kinds. If he has long been accustomed to wine, he may be allowed a small quantity of spirits and water.

"After an attack of gouty inflamation in the foot, we see the parts continue long tumid, weak, and morbidly sensible, while the most trifling accident, internal or external, is apt to produce a relapse. The same is observed in regard to the eye, only that in this organ we have the advantage of directly witnessing the exceedingly relaxed, varicose, and livid state of the blood vessels, an indication of how much is wanting to restore the affected parts to their natural tone. Even after an acute attack of arthritic iritis subdued, some counter irritating means ought to be continued, such as a seton in the neck, and recourse should be had to the use of local applications of a tonic kind. As a means of this sort, the Germans are in the way of using small bags of dried aromatic herbs, suspended over the eye. The bags are made of old linen, and are quilted, so as to keep the herbs equally spread out. The aroma, constantly emanating from the herbs, imparts a permanent, pleasant and useful stimulus to the debilitated blood vessels and nerves. The best herbs for this purpose, are bruised chamomile flowers, sage, rosemary, marjoram, and the like, with or without the addition of a little powdered camphor. If the exhaled aroma reproduces redness of the eye or aversion to light, this will indicate that the proper time for the use of local stimuli has not yet arrived, and that they must be postponed. Friction round the orbit once or twice daily with alcohol, tinctura aromatic ammoniata, or the like, is another local preventive measure which is found of use. Even stimulants to the eye, as vinum opii and red precipitate salve, begining these preparations in a dilute state, and gradually augmenting their strength, are found to abate the morbid sensibility of the eye, and thus render it less apt to suffer from the ordinary external as well as internal causes which produce inflammation. It must not be forgotten, however, that remedies of this kind, if used before the inflammation is completely subdued, will, as in every other species of iritis, produce the very worst effects.

CHOROIDITIS.

“As the choroid coat is completely hid from view, and exercises but a subsidiary function, it is not to be wondered at, that while inflammation of every other part of the eye, conjunctiva, sclerotica, cornea, iris, lens, and retina, has been acurately discriminated, inflammation of the choroid has hitherto scarcely attracted attention. In an early stage, choroiditis is one of the least striking of the ophthalmiæ; when far advanced, the signs of disorganization which attend it, are more remarkable than those of vascular action; and while the effects are too serious not to have attracted attention, the cause of these effects, and the seat of the original disease, have in general been hid in obscurity, or passed over without notice.

“I have already had occasion to mention, that iritis is occasionally attended by inflammation of the choroid. Were we to adopt the common notion, that the iris is a continuation of that membrane, we might be led to conclude, that choroiditis and iritis should always go together. Perhaps, in some degree, this may still be the case. At the same time, from the arteries which nourish these two parts being quite distinct in their course and distribution, the idea of a seaparate iritis, and a separate choroiditis, is *a priori* rendered probable.

“For some time, the separate existence of choroiditis was with me rather a matter of speculation, and a conclusion from analogy, than a fact ascertained by observation. I am now convinced, however, that the choroid is sometimes the seat, almost quite independently, of inflammation; that in certain cases of ophthalmia, it is the focus of the disease, and that the neighbouring parts may be as little affected when that is the case, as the sclerotica is in iritis, or the iris in sclerotitis. That it is of importance to distinguish the disease which I am now about to describe, will appear very evident, when we consider its dangerous nature. Its symptoms, as we shall immediately see, are very different from those of any other ophthalmia; and although ultimately the whole eye may be involved by inflammation commencing in the choroid, yet choroiditis, in the early stage, exists without any signs of disease in the iris, and without any other effects upon the sclerotica and retina, than those which must necessarily arise from the pressure of an inflamed and swoln membrane, placed in contiguity with other membranes, more or less susceptible of suffering from that pressure. I consider choroiditis, therefore, as completely a primary and distinct disease.

"*Symptoms.* 1. *Discolouration of the white of the eye.* From the pressure outwards of the inflamed and tumefied choroid, the exterior tunics of the eye become extenuated, so that the choroid shows its dark colour through the sclerotica, which therefore appears blue or purplish. This is one of the most remarkable symptoms of choroiditis, and takes place in many cases at a very early period of the disease. The degree of the discolouration is different, according to the severity and duration of the attack, being sometimes merely perceptible on comparing the diseased with the healthy eye, or the diseased side of the eye with the healthy side, while in other instances, it amounts to a deep blue.

"2. *Tumour.* After continuing for a time discoloured merely, the part affected protrudes. This commonly takes place on one side only of the eyeball, generally near the cornea, as if the corpus ciliare was the seat of the disease, and more frequently above, or to the temporal side of the cornea, than below, or to its nasal side. The tumour may enlarge to the size and prominence of half a filbert or more. It is then generally of a deep blue colour, with varicose vessels running over it, and has been described under the name of *sclerotic staphyloma.* Several such tumours may surround the cornea.

"The front of the eye, however, is not the only seat of choroid staphyloma, as it might be called with more propriety than sclerotic, considering the actual origin of the protrusion. Scarpa tells us that he had never met with any tumour or elevation of the sclerotica on its anterior surface, resembling a staphyloma; but that he had twice happened to meet, in the dead body, with staphyloma of the posterior hemisphere of the sclerotica. The first time was in the eye of a woman of forty years of age. The eye was of an oval figure, and upon the whole, more voluminous than the sound eye on the other side. On the posterior hemisphere of the diseased eye, and to the external or temporal side of the entrance of the optic nerve, the sclerotica was elevated in the form of an oblong tumour, like a small nut. As the cornea was sound and pellucid, and the humour still preserved their natural transparency, on looking through the pupil, there appeared towards the bottom of the eye, an unusual brightness, produced by the light penetrating that part of the sclerotica, which had become thin and transparent where it was occupied by the staphyloma. When the eye was opened, the vitreous humour was found entirely disorganized, and converted into limpid water, and the chrystalline lens somewhat yellowish, but not opaque. When the posterior hemisphere of the eye was immersed in spirit of wine, with a few drops of nitrous acid added to it, in order to give the retina consistence and opacity, it was distinctly perceived that there was a deficiency of the nervous expansion of the retina within the cavity of the staphyloma; that the choroid was very thin at this part, deprived of its natural colour, and of its usual vascular network; and the sclerotica, particularly at the apex of the staphyloma, was so thin as scarcely to equal the thickness of writing paper. The woman from whom this eye was taken, had lost the faculty of seeing on that side some years before, during an obstinate ophthalmia, attended with most severe, and almost habitual pains in the head.

Scarpa had an opportunity of making similar observations on an eye met with accidentally by Dr. Monteggia of Milan. It was taken from a woman, thirty-five years of age, was of an oval figure, and longer than its fellow. The staphyloma was situated exactly as in the former instance. The vitreous humour was dissolved; the chrystalline capsule was distended by a thin whitish fluid; the lens yellowish, and less than natural; the retina deficient within the staphyloma; the choroid and sclerotica, forming the tumour, thinned, so as to transmit the light. Nothing positive could be ascertained regarding this woman's sight.*

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*Trattato delle principali Malattie degli Occh. Vol. ii. p. 146. Pavia, 1816.

"*Effusion between choroid and retina.* That the vessels of the choroid are greatly enlarged in this disease, does not admit of a doubt. I remember having seen in the hands of Professor Beer, a preparation in which the varices of an inflamed choroid were as large as small peas. At the same time, the distention which the choroid and sclerotica suffer in this disease, is not owing entirely to thickening of the former coat, or to varicose distention of its blood vessels, but is often connected with an effusion of watery fluid between the choroid and retina. This I have frequently had occasion to evacuate with the needle. If this is not done, it accumulates to such a degree as to press the retina before it, and having at last produced, by means of its continued pressure, an absorption of the vitreous humour, it gathers the retina into a cord, which stretching from the entrance of the optic nerve to behind the lens, is seen through the pupil, and looks like a deep-seated cataract, or like the advancing tumour in medullary fungus of the optic nerve. A beautiful specimen of this state of the retina, I owe to the kindness of Mr. Norris, of the Royal Infirmary.

"4. *Redness.* The arteries which are visible on the surface of the sclerotica in the state of health, are much enlarged in cases of choroiditis, and ramify over the distended portion of sclerotica. Not unfrequently we observe a patch of redness near the edge of the cornea, fed by one or more of these arteries, greatly dilated. Sometimes the redness is confined to the upper part of the eyeball. There is scarcely ever any general redness, or much inflammation of the conjunctiva. It is either sclerotic, or consists in an enlargement of the visible arteries derived from the recti muscles.

"5. *Displacement of the pupil.* The iris is not affected with inflammation in choroiditis; but the pupil, in almost every case which I have witnessed, has undergone a remarkable change of place. The iris is always narrowed towards the portion of the choroid which is affected, and in many instances, the pupil is observed to have moved so much out of its natural situation, as to be almost directly behind the edge of the cornea. Upwards, and upwards and outwards, are the directions in which the pupil is most frequently observed to become displaced. It occasionally continues small and moveable, in other cases it is immoveable, but not dilated; in very severe cases it is greatly enlarged, the iris having entirely disappeared at that part of its circumference towards which the displacement of the pupil has happened.

"The remarkable displacement of the pupil which attends choroiditis owing probably to some affection of one or more of the ciliary or iridal nerves, which running forward between the sclerotica and choroid, pass through the annuals gangliformis, and ultimately reach the iris. This symptom has been remarked by Beer as an attendant on syphilitic iritis. That it is not a constant attendant is well known. I have seen it in other varieties of iritis. It has never been attributed to any affection of the choroid, nor has any explanation of its cause been offered.

"The pupil does not return to its place, even although the choroiditis is subdued.

"6. *Opacity of the cornea* is of course not a necessary, although a frequent attendant on choroiditis. It is generally the edge of the cornea nearest to the portion of affected choroid which becomes opaque, so as to resemble part of a broad arcus senilis, the rest of the cornea remaining perfectly clear. In other cases, there are pretty extensive but very irregular spots of whiteness, more the effect apparently of interrupted nutrition than inflammation. In some severe and long-continued cases of choroiditis, the cornea becomes almost altogether opaque, and partaking in the staphylomatous degeneration of the neighbouring sclerotica, even undergoes a degree of dilatation, so as to become considerably broader and more prominent than it is in the natural state.

"From this affection of the cornea alone, independent of the interior changes of the eye, the patient's vision may be almost or altogether lost.

"7. *Exophthalmos and Exophthalmia.* In consequence of choroiditis, the eye may enlarge, and even protrude from the orbit to a very considerable degree, without much inflammation of the sclerotica and conjunctiva, these tunics being merely thinned by the pressure of the distended choroid. After a time, however, the eye in this state of exophthalmos, is apt to suffer from external inflammation, in consequence of being but imperfectly protected by the lids, or it may be, in consequence of cold or mechanical injury. When the inflammation, thus excited, runs to a great height, the conjunctiva becomes chemosed, puriform fluid is deposited behind the cornea, or between its lamellæ, the eye bursts, continues to swell and protrude still more, assumes a fungous appearance, bleeds profusely, and being productive of great pain and deformity, evidently requires to be extirpated.

"8. *Intolerance of light* and *epiphora,* generally attended this disease in a considerable degree.

"9 *Pain.* This varies much in different individuals. When there is as yet no protrusion, the pain is moderate; when the sclerotica is much pressed and distended, and especially when this takes place suddenly, and is attended with considerable increase of redness, the pain in the eye becomes severe, and sometimes furious. Hemicrania is also present, affecting principally the top of the head, the high part of the temple, and the cheek. It is not strictly circumorbital, nor is it strikingly nocturnal.

"10. *Vision* is variously affected in cases of choroiditis. In some, the very first symptom complained of, is dimness of sight. Hemiopia, all objects to one or other side of a perpendicular line, or above or below a horizontal line, appearing dim, all objects appearing confusedly, and as if double, even when viewed with one eye, are symptoms which not unfrequently distress the patient long before any redness or blueness of the eye is visible. If the disease goes on, we sometimes find that total blindness ensues, even when the choroid appears but partially affected; while in other cases the whole choroid is evidently affected, the whole eyeball enlarged and discouloured, and yet a considerable degree of vision is retained.

"*Constitutional symptoms* 1. The subjects of this disease are adults. I have never seen it in children. Those of strumous constitution are more subject to it than others.

"2. Various degrees of febrile excitement attended choroiditis. In the early stage, before distension brings on acute pain, the pulse is not affected; after the patient has suffered much, a cachectic state is apt to follow, with quick pulse, pale or sallow complexion, excessive nervous irritability, and great general weakness.

"3. The digestive organs are frequently much deranged, even from the very first. Want of appetite, frequent acidity of stomach, costiveness, flatulence, and foul tongue, attend the disease in many instances.

"*Remote and exciting causes.* I have been led to ascribe the commencement of inflammation of the choroid to such causes as the following.

"1. Want of exercise; too much confinement within doors.

"2. Derangement of the stomach and bowels.

"3. Over-use of the eyes, in reading, sewing, miniature-painting, and other minute works.

"4. Exposure to too much heat and light, and especially to the glare of hot fires, and to sudden changes from heat to cold.

"5. Blows on the eye.

"*Prognosis* Recovery is always slow. If the disease has gone to any considerable length, it is scarcely ever completely removed. The vestiges of it are in general permanent, even after it has been completely checked in its progress. In many cases, we may reckon ourselves fortunate, if we arrest this disease. Yet it sometimes happens that the cure proceeds to a degree beyond our expectation. I lately attended a gentleman who many years before had almost entirely lost the sight of the left eye from this disease. The right was now attacked. Both pupils were greatly displaced; the visible arteries of the right eye were much dilated, and the sclerotica at different places considerably extenuated; the left eye was enlarged, of a pretty deep blue colour, and a great part of the cornea opaque. By blood-letting, counter-irritation, and other remedies, the disease was arrested in the left eye, and very unexpectedly the right eye recovered to such a degree, that he was again able to read with it an ordinary type.

" *Treatment.* 1. *Blood-letting.* Profuse and repeated blood-letting does more good in the early stage of choroiditis, than all other remedies put together. Yet we might perhaps not be tempted to bleed sufficiently at this period of the disease, from the circumstance that in many instances, there are no external signs of intense inflammation, and the patient does not suffer any acute pain. The practitioner, therefore, who is not acquainted with the nature and symptoms of this ophthalmia, might be apt to trifle away time in the application of a few leeches, when he should be opening the temporal artery, and removing a large quantity of blood. I have known the blueness and evident distension of the sclerotica, which, notwithstanding leeching and other remedies, had continued unabated for many weeks, disappear suddenly and completely, after the loss of twenty or thirty ounces of blood from the temple. Bleeding from the jugular vein, or from the arm, is also highly useful. Twenty-four or more leeches round the eye, every second day, I have seen attended by the best effects. In chronic cases, we must not neglect the frequent and liberal application of leeches.

" 2. *Purgatives* are of essential service. The disordered state of the biliary and other digestive organs, indicates the use of calomel as a cholagogue, followed by salts and senna, or some other brisk purgative. Such remedies are to be repeated frequently, during the course of the treatment.

" 3. *Mercury.* We are naturally led to advise mercury in choroiditis, from observing its happy effects in iritis. But on the whole, I must confess, that in the former disease, I have not witnessed any remarkable benefit, either from making the mouth sore, or from small doses long continued. I have used this medicine both in friction to the head, and in various forms internally; but it has appeared inert so far as the choroiditis is concerned. Still I have hitherto continued to prescribe mercury in this disease, because the cases which I have treated are too few to enable me to decide completely on this point, and because this medicine is found to do good in all other chronic inflammations of the eye.

" 4. *Turpentine* I have lately tried in one or two cases, but am unable as yet to come to any conclusion regarding its effects.

" 5. *Iodine.* In one case only have I fully tried this powerful sorbefacient, and I am happy to say, with an amount of good effects altogether unlooked for. An eye which I had many times punctured, and had fairly made up my mind to extirpate, has shrunk considerably under the use of the tincture of iodine, while the sclerotica has assumed much more of its natural whiteness.

" 6. *Tonics.* After due depletion, I have seen much benefit accrue from the precipitated carbonate of iron, and the sulphate of quina. They may be given separately, or together.

" 7 *Counter-irritation* is decidedly useful. A tartar emetic eruption between the shoulders is perhaps the most effectual.

" 8. *Paracentesis oculi.* Puncturing the sclerotica and choroid, so as to evacuate the aqueous fluid collected between the latter tunic and the retina, is a remedy of much importance in the treatment of this disease. It is not to be tried in the acute stage, at least I have not dared to try it except in the chronic stage, and when there was an evident tendency to staphyloma scleroticæ. The operation is performed with a broad cataract-needle, which is to be thrust, not in the direction of the lens, which it might readily wound and render opaque, but towards the centre of the vitreous humour. The instrument need not penetrate deeper than the eighth of an inch. A little blood is usually discharged from the divided portion of the choroid, mixed with aqueous fluid of a slightly glutinous consistence. The operation gives great relief to the feeling of distension or pressure in the eye, and to the attendant headach. It may be repeated every eight days, or at longer intervals, according to the state of the eye.*

RETINITIS.†

"It is easy to understand that the internal inflammations of the eye may arise sometimes in one texture, and at other times in another; that in one case the bloodvessels of the retina shall be first affected, in another, those of the choroid, in a third, those of the iris. The point of origination will depend on the natural constitution of the organ, and the manner of action of the exciting cause. Even from birth, the eye varies much in different individuals, one or other texture appearing to be congenitally weaker or stronger than the others, so that the same exciting cause, operating on a number of persons, shall produce in one, inflammation of the conjunctiva; in another, sclerotitis; in a third, iritis; in a fourth, inflammation of the retina. On the other hand, the nature of the cause leads in one case to external, in another, to internal ophthalmia. Cold, operating on the eye, will bring on inflammation of the conjunctiva or sclerotica, while the sudden and direct reflection of a strong light into the eye will be apt to produce an inflammation of which the retina is likely to be the focus. The inflammatory action, however, is seldom, if ever confined to the part first affected. We have already seen how inflammation, originating in the iris, spreads to the sclerotica, and to the choroid; and how choroiditis affects the textures both within and without the choroid. In the same way inflammation commencing in the retina is likely to spread inwards to the vitreous humour, to the capsule of the lens, and to the lens itself, all which parts are fed by branches from the central artery of the retina; and outwards, to the choroid and iris, to the sclerotica and cornea, and to the conjunctiva. Thus an inflamation of the whole eyeball may arise from a very limited point of origin.

"Nor is this a fanciful picture of disease. Although a retinitis, ending in general ophthalmitis, and arising from causes of very limited and trasient action, is rare; yet it occasionally occurs, especially after long continued straining of the sight in the examination of very small, perhaps microscopical objects, under a strong light, reflected into the eye, either immediately from the object of examination, or from a speculum.

"In such cases, however, there are commonly certain predisposing causes, which ought not to escape observation; such as plethora in and near the organ of vision.

"Unexpected and vivid flashes of lightning sometimes excite inflammation of the retina, and this disease has frequently been excited by imprudently viewing an eclipse of the sun. Prisoners who have been long confined to the darkness of a dungeon, have been seized with inflammation of the retina on being brought suddenly forth into the full glare of day. Travelling over a long tract of country covered with snow, has been known to produce the same effect. Saint-Yves notices the case of a man who became blind in consequence of going too close to the light and heat of a strong fire, in attempting to tie a string to a fowl, turning on the spit; and another of a workman in the mint, who lost his sight from the brilliant flashing to which he was exposed, while pouring metal into a red-hot crucible. Both of these accidents were probably owing to retinitis.

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* See a case of Staphyloma Scleroticae successfully treated, by repeatedly tapping the Eye; by Richard Martland, M. D., in the Edinburgh Medical and Surgical Journal. Vol. xxiii. p. 59. Edin. 1825.

† Ophthalmitis interna idiopathica proprie sic dicta of Beer.

"The Esquimaux, who inhabit Hudson's Bay, are well aware of the loss of vision which arises from exposing the eyes to the constant view of a country covered with snow. They make use of a kind of preservers, which they term snow-eyes. These consist of two pieces of wood or ivory, so formed as to fit the eyes, which they completely cover, and are fastened behind the head. Each piece presents a narrow slit, through which every thing is distinctly seen. This invention preserves them from the snow blindness, which is apt to be occasioned by the strong reflection of the sun's rays, and which, it is probable, is the effect of inflammation excited in the retina.[*]

"Blinding persons by producing retinitis was, and still is, in some countries a mode of punishment. The person is compelled to look steadily on a concave mirror of polished steel, held opposite to the sun. This would excite speedy inflammation of the retina, and certainly end in a greater or less degree of insensibility to light. Some such method must be employed in India at this day, as many of the native princes, who have been condemned to the loss of sight by the jealousy of their rivals, but are suffered to live in a state of captivity, are said to have no appearance, at a little distance, of being blind.

"Chronic cases of retinitis not unfrequently present themselves to our observation, under the designation of weakness of sight, and are characterised by a morbid sensibility to light and slight obscurity of vision, followed after a lapse of time by gradual contraction of the pupil, immobility of the iris, and amaurosis. Watchmakers, jewellers, and those who spend great part of the day and night in reading and writing, are apt to be affected in this way. Such cases are often injured by stimulant and tonic treatment, while on the other hand they are greatly benefited by leeches round the eyes.

"Dr. Mirault has published a paper on inflammation of the retina,[*] in which he describes under this name, the common strumous or phlyctenular ophthalmia, maintaining that the excessive intolerance of light which accompanies this disease, can be attributed only to retinitis. This, however, is a mistake. We see an equal degree of intolerance of light brought on, in an instant, by the presence of a particle of dust between the eyeball and upper eyelid; and there can be no doubt, I think, that conjunctivitis, not retinitis, is the cause of the same symptom in strumous ophthalmia.

"The following are the symptoms of sudden and severe retinitis. The patient first complains of a general feeling of pressure and tension in the whole eyeball. To this there succeeds an obtuse, deep-seated, pulsating pain, which seems to increase every moment, and soon extends to the eyebrow and cranium. The power of vision is already sensibly diminished, and every hour becomes more and more feeble. At the same time, the pupil is observed to have lost its glancing blackness, and to have become much contracted. Without becoming angular or deviating from its natural situation, it at length completely closes, the iris having reached its greatest possible degree of expansion, and seeming no longer to be perforated by any central opening. Long before the pupil is closed, the sensibility of the retina seems extinct; and yet even when the pupil is closed, and there is no longer any trace of perception of light from without, the patient experiences a troublesome sensation of fiery spectra with every oscillation of the internal bloodvessels of the eye.

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[*] These instruments also increase the powers of vision, so that the Esquimaux are so accustomed to their use, that when they are desirous of viewing any thing at a distance, they mechanically apply them to their eyes. Different accounts are given of the slit or slits in these instruments, for some tell us there is only one in each eye-piece, and that it is long and narrow, while others say that there are two, about a quarter of an inch long. This is probably regulated by the fancy of the wearer.

[*] Archives Generales de Medecine. Tome xx. p. 477. Paris, 1829.

"While these changes are taking place, the iris loses its natural colour, becoming greenish or reddish according to its original hue. The anterior chamber is strikingly diminished in size, the iris having advanced towards the cornea. By the time that this advancing of the iris is first discerned, which is generally when the pupil is still of considerable size the whole sclerotica is rose-red. The conjunctiva some time after presents a pretty thick network of blood-vessels, and the cornea loses much of its natural lustre without becoming absolutely opaque. The last mentioned symptoms make their appearance under severe inflammatory sympathetic fever, along with insufferable and almost maddening headach. Sometimes it happens that during this first period of the disease, the pupil, though much contracted, does not completely close; but it is cloudy, and on looking at it through a magnifying glass, or even by merely concentrating the light upon it, is seen to be reddish-gray, while the power of vision is totally lost.

"So severe are the sympathetic fever and headach which attend retinitis, that it sometimes passes with medical men who have not studied the diseases of the eye, for phrenitis or brain-fever, the characteristic symptoms of this ophthalmia, from which the affection of all the other parts arises, not being sufficiently prominent to arrest attention. The occulist generally finds retinitis so far advanced in its progress, as to be almost altogether beyond control.

"The pain of the eye now becomes unequal; it is still pulsative, but is now attended by a feeling of cold and weight in the part. Shiverings take place, and there suddenly appears a quantity of pus at the bottom of the anterior chamber. This matter presents a horizontal surface and is sometimes seen to change its position on the head being moved from side to side. It constantly increases in quantity, till it not only reaches the pupil, but at length fairly fills the anterior chamber. It may accumulate to such a degree, especially in neglected cases, that the cornea projects, assumes the appearance of an abscess ready to burst, and at last gives way under insufferable pain. The eye then collapses, and the pain gradually subsides.

"If the pupil has not completely closed by the end of the first stage, we see, just at the moment when the hypopium begins to form fine whitish filaments of lymph shooting from the edge of the pupil towards its centre. Viewed through a good lens, these have the appearance of a delicate cobweb. After the pus has covered the pupil, and remained perhaps long unabsorbed, this cobweb-lide pseudo-membrane becomes whitish-yellow from little particles of the pus lodging in its interstices, and sometimes a single piece of what appears to be thickened purulent matter, attached to this membrane, projects through the pupil, intimately connected also with the papillary edge of the iris. But if the pupil has closed completely in the first stage, of course nothing of this spurious cataract is observed.

"*Prognosis.* The prognosis in retinitis is not unfavourable, if a proper method of treatment be commenced before the pupil is much contracted, or the power of vision greatly lessened. If vision seems already extinguished, the prognosis is extremely unfavourable. Beer, indeed, had in two cases seen vision return with the arrest of the inflammatory symptoms, but in both a very considerable weakness of sight remained during life, and the patients could read large print only with much difficulty, and small print not at all. If the pupil be once closed, even before the retina appears to have become insensible, there is no longer any hope of preserving sight; for even should the pupil re-open in some degree, as it occasionally does on the inflammatory symptoms being arrested, yet it remains small and motionless, and the eye is still blind. If retinitis be completely misunderstood in the commencement, neglected or mistreated, it proceeds rapidly on to a dangerous inflammation of the whole eyeball.

"In the second stage the prognosis is always bad. For before the disease has advanced so far, vision is irretrievably lost. All that can be done is to endeavour to save the form of the eye, by limiting the suppuration as much as possible. If this disease has been misunderstood at the commencement or mistreated, so that it has gone on to a complete ophthalmitis, attended with chemosis, there is much danger that in the second stage not even the form of the eye will be saved.

" *Treatment.* Complete rest of the eyes and of the whole body, darkness, abstinence, and active depletion, followed by the rapid introduction of mercury into the system, are the means to be depended upon in the first stage of retinitis. Copious blood-letting from the arm is to be immediately followed by a plentiful application of leeches round the eye. Should the pain of the eye and head still continue, the jugular vein or temporal artery ought to be opened, and a considerable quantity of blood abstracted.

" Calomel with opium ought to be given in frequent doses, till the mouth is affected.

" Belladonna is to be applied in the usual way.

" In the second stage the preservation of sight is out of the question. A warm emollient poultice is to be laid over the eye-lids. If only a small quantity of matter be present in the anterior chamber, we must on no account let ourselves be induced by that to open the cornea, for the purpose of evacuating it; but trust to the sorebefacient effect of the mercury, assisted by blisters behind the ears or on the back of the neck. Beer recommends the eye in that state to be touched repeatedly in the course of the day with vinum opii, by the careful use of which, in combination with the internal employment of opium and sometimes of cinchona, he had seen collections of pus in the anterior chamber completely disappear. Should the hypopium increase, so that the anterior chamber is filled, we cannot trust to its absorption, but must give exit to the matter by opening the cornea with the extraction knife. In such circumstances, the natural appearance of the cornea and iris is completely lost, the eyeball sometimes remaining flattened in the situation of the cornea, while in other cases it becomes staphylomatous.

AQUO-CAPSULITIS.

" By the term *aquo-capsulitis* is meant inflammation of the cartilaginous membrane, generally considered as serious, which lines the internal surface of the cornea. When this membrane is inflamed, it becomes more or less opaque; there is at the same time a muddiness in the anterior chamber, and occasionally an appearance as if the eyeball were unusually full and prominent. This arises from an increase in the quantity of the aqueous humour, the balance of action being suspended, which naturally exists between the exhalents and absorbents of that fluid. In more severe cases, coagulable lymph is effused from the lining membrane of the cornea, and if the iris be at the same time in an inflamed state, this effusion may become the medium of adhesion between the iris and the cornea.

" Besides the diffused muddiness, there are often present in this disease one or more milk-like spots on the internal surface of the cornea, which even the least experienced may readily distinguish from any of the common superficial opacities of that part. The spots in question give the cornea a mottled appearance, and form by far the most characteristic mark of this ophthalmia. Mr. Wardrop has accurately described their more opaque central points as surrounded by a kind of disk, resembling what is called the eye of a pebble. He seems to ascribe the whiter point in the centre to opacity of the substance of the cornea, and the disk to that of the lining membrane.

" This mottled appearance I have seen very distinctly in two cases; and what was very remarkable, in one of these, the spots appeared and disappeared at different points of the internal surface of the cornea, even in the space of a few hours, so that the patient saw worse in the morning when most of the spots were observed, and better towards the evening when those at the upper part of the cornea had greatly diminished. There accompanied this singular case, a general turbidness in the morning. The whole appearance of the anterior chamber, and of the spots in question, resembled very much the effect which might be supposed to be produced, were a quantity of minute drops of ammoniated oil mingled with the aqueous humour. This state of the cornea was the consequence of pretty severe inflammation, about nine months before, in a patient who had long been troubled with rheumatism.

"The appearance of the redness in aquo-capsulitis, so far resembles that in iritis, that there is a circular zone of minute vessels seen on the anterior part of the sclerotica. Sometimes one or more distinct blood vessels are seen traversing the inflamed membrane. Some vessels of the conjunctiva also are frequently enlarged. These appear as insulted trunks, and can be raised on the point of a needle from the sclerotica. The vessels on the white of the eye are of a bright red colour during the active stage of the inflammation, and gradually assume a more crimson hue as the symptoms subside.

"There sometimes attends this disease an increased flow of tears, but the patient in general sufferers very little from exposure to light.

"Vision is more or less dim; and what is particularly to be noted, is a sensation of distension and fulness in the eyeball, accompanied with a dull aching pain, generally in the forehead, sometimes also in the back part of the head; symptoms which Mr. Wardrop assures us are instantly and permanently relieved by evacuating the aqueous humour.

"The constitutional symptoms vary much in their degree of severity. Sometimes the pulse is very frequent and hard, the skin hot and dry, the tongue loaded, and the functions of the alimentary canal disordered. In other cases, the disease almost from the commencement, assumes a chronic form, and after continuing a certain period, participates in any perculiarity of the patient's constitution, and becomes thereby modified.

"During the continuance of the inflammatory symptoms, there is generally so much muddiness diffused over the whole anterior chamber, that no distinct portions of effused lymph can be distinguished, unless they be of large size; but when this turbid state goes off, flakes of lymph may sometimes be perceived, and in other instances, the whole surface of the inflamed membrane is left covered by a thin layer of it. In some cases, the effused lymph floats in the anterior chamber, appearing like a thick cloud; in other cases, it is deposited in streaks, so as to present a reticulated appearance; and in others, it resembles a purulent fluid.

"If the effused lymph be not afterwards absorbed, it is apt to become organized; and not unfrequently red vessels can be seen ramifying through it. This is a much more frequent appearance than that to which I have already referred, of a red vessel or vessels running along the internal surface of the cornea without any effusion of lymph.

"*Treatment.* Little else is known regarding the effects of remedies in this rare ophthalmia, than what is mentioned by Mr. Wardrop, in his paper on Evacuation of the Aqueous Humour, in the fourth volume of the Medico-Chirurgical Transactions. In the cases there recorded, benefit appears to have been derived from cupping the temples, purging, fomenting, and the application of such stimulants as murias and nitras hydrargyri in solution, red precipitate salve, and sulphuric ether. Mr. Wardrop, however, places most reliance on the evacuation of the aqueous humour, stating that there is no inflammation of the eye, where so much benefit is derived from that operation, as when the disease affects the internal layer of the cornea. He had never found it fail in procuring immediate relief of the pain of the head, and instantaneous restoration of the transparency of the anterior chamber.

"The opening through the cornea, by which the aqueous humour is to be discharged, may be made with any of the knives commonly used for extracting the cataract, or with a broad iris-knife. It is sufficient that the point of the intrument be introduced so that it makes a puncture into the anterior chamber; this should be done near the junction of the cornea and sclerotica, at any part of the circumference. When the knife has penetrated into the anterior chamber, it may be withdrawn a little, and the blade turned on its axis, when the aqueous humour will readily escape. It is better not to remove the instrument altogether, till the fluid is observed to be discharged; for if the incision be not sufficiently large, and the knife taken away before the aqueous humour flows out, the elasticity of the cornea closes the wound, and either hinders the evacuation from being so sudden, and consequently so efficacious, or the closure of the wound entirely prevents its escape. The operation, therefore which is necessary to discharge the aqueous humour, is merely the first step of the section of the cornea, made in extracting the cataract, or what is called the *punctuation.*

" The chief difficulty in performing the operation, arises from the pain occasioned by the necessary pressure on the eyeball, whilst keeping open the eyelids; but until a sufficient portion of the cornea is brought into view, and the movements of the eye completely under the management of the operator. the introduction of the knife should not be attempted. The upper lid should be elevated by the fingers of the assistant, or by Pellier's speculum; while the operator, with the fore and middle fingers of the hand which does not hold the knife presses down the lower lid, and applies their points over its edge, in such amanner that they touch the eyeball, and can apply any degree of pressure upon it which may be necessary. After the assistant raises the upper lid, the patient should be directed to look downwards; and then the assistant employs a sufficient pressure, to keep the eye in that position.

" The operator now makes the puncture; but as the patient is very apt to start when he first finds the instrument coming in contact with his eye, it is useful merely to touch the cornea repeatedly with the back of the knife till all risk of starting is over; and as soon as its extremity rest on the part where the puncture is to be made, the knife may readily be raised on its point, and thrust into the anterior chamber.*

" It is probable that a variety of other remedies besides those mentioned by Mr. Wardrop might be useful in aquo -capsulitis; especially cinchona, turpentine, and mercury. Of these, however, nothing can be said from experience.

INFLAMMATION OF THE CHRYSTALLINE LENS AND CAPSULE.

" Common lenticular cataract appears to be a consequence of the impeded nutrition which attends the advanced period of life; while opacities of the capsule are probably in all instances the result of inflammation, and thus resemble specks of the cornea. Capsular and capsulo-lenticular cataracts generally present themselves to our observation after the inflammation in which they have originated has subsided; but in other cases, we may be fortunate enough to meet with the disease in its acute stage. The appearances which are then presented to observation, have been minutely described by Professor Walther,* and I have had more than one opportunity of verifying, to a certain extent, the accuracy of his description.

"He states that inflammation of the chrystalline capsule generally occurs about the middle of life, and in subjects of a slight cachectic disposition. This is certainly true, although in more than one instance I have seen such severe inflammation of the capsule in young children, that the part appeared completely loaded with red vessels. This disease occurs oftener in light eyes than dark, and is always accompanied by a slight change in the colour of the iris and form of the pupil, the iris becoming a little darker, and the pupil oval or irregular. The motions of the iris are at first lively and extensive, but subsequently become sluggish and very limited. The pupil is smaller than in the sound state, and there usually appears a black rim of irregular breadth all round its edge, arising from the pigmentum nigrum of the posterior surface of the iris coming into view.

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* Medico-Chirurgical Transactions, Vol. iv, p. 153. London, 1813.
* Abhandlungen aus dem Gebiete der practischen Medicin. Vol. i. p: 53 Landshut, 1810.

"Along with these symptoms, a number of red vessels appear in the pupil itself, the largest of which are visible to the naked eye, but the greater number distinguishable only by the aid of a magnifying glass. What at first merely appears a red point, assumes under the glass, the appearance of a delicate tissue of vessels. The lens used for this microscopical examination of the eye should be one of a very short focus, and the patient should be so placed with respect to the light that the parts within the pupil be well illuminated, and not shaded by the glass nor by the head of the observer. In order to have the pupil as large as possible, the other eye should be closed during the examination, and a little of a filtered solution of extract of belladdonna in water should be dropped upon the affected eye an hour previously. In inflammation of the capsule of the lens, the sensibility not being much increased, the patient can bear examination of the eye in a strong light and with a dilated pupil, without much uneasiness.

"The red vessels observed in the pupil during inflammation of the anterior hemisphere of the capsule always constitute a sort of vascular wreath, situated at about a quarter of a line's distance from the pupillary edge of the iris; this wreath forms a concentric circle within the pupil, and is found on examination to consist, not of one or a few vessels circularly disposed, but of a number of vascular arches. To this vascular wreath there run in a radiated form numerous vessels from the circumference of the capsule. Other vessels seem to extend from the pigmentum of the iris; but such are not constantly present. It is only in cases where the disease has lasted some considerable time that they appear. In other cases, according to Professor Walther, vessels seem to be prolonged rather from the capsule into the posterior surface of the iris. Those which run from the iris to the capsule, never arise from the edge of the pupil, but at a little distance from it, on the posterior surface of the iris, so that nearly a line's breadth next the pupillary edge is free from these vascular sproutings.

"From the vascular wreath already mentioned, vessels are seen spreading towards the centre of the anterior capsule, and these again forming clusters and arches. Although the continuation between the vessels seen in different parts of the pupil seems interrupted at some points, yet there can be no doubt of their being continuous, although from their extremely minute size they can be distinguished only where enlarged and clustering together.

"Posterior to the red vessels seen in the capsule, there appears in some cases a network of more delicate vessels, which seem to be seated in the lens itself. The larger trunks of this network are not always derived from the circumference of the lens, but evidently come, says Professor Walther, from its posterior surface, directly forwards, and then divide into branches. The presence of these vessels in the lens, he has repeatedly and distinctly observed. He states that they present one of the most beautiful phenomena, and that the only things which come near them are the finest injections of the choroid, such as those which are in the possession of Soemmerring, and have been represented by him in his work on the anatomy of the eye.

"Professor Walther is of opinion that the existence of these vessels passing into the substance of the lens is entirely morbid, and he compares it to what occurs in inflammation of the thorax, when vessels are prolonged from the pleura to the pseudo-membrane formed on its surface. He says that as the vessels of the anterior hemisphere of the capsule shoot forwards into the posterior surface of the iris so they shoot backwards into the lens itself; and that the same holds good with respect to the posterior hemisphere of the capsule, which being more copiously supplied with bloodvessels, it is explained how the largest vessels of the lens are seen to come from behind forwards. It would appear also that all inflammations of the lens begin in the capsule, a fact which Professor W. considers as analogous to the spread of inflammation to the capsule from the ciliary proceses or from the iris.

"At the apparent termination of several of the vessels in the capsule, there are distinctly perceived little knots of a whitish-grey semi-transparent substance. This is evidently coagulable lymph, and Professor W. considers its presence as disclosing the manner in which inflammation of the capsule and lens produces opacity of these parts. The anterior hemisphere of the capsule, where the vessels are very numerous, sometimes assumes a peculiar velvety or flocculent appearance, and in one or more spots of its extent presents a grey or brownish colour. These brownish spots appear in some instances to be nothing more than effused lymph; but in other cases they probably owe their origin to the iris having been united to the capsule by partial adhesions, which being separated either by more extensive spontaneous motions of the iris, by mechanical violence, or by the sudden influence of belladonna or some similar narcotic, part of the pigment of the iris has remained adherent to the anterior surface of capsule.

"It is a fact strongly confirming the accuracy of Professor Walther's account of inflammation of the chrystalline capsule, that in anterior capsular cataract, the specks or streaks generally radiate from the edge of the anterior hemisphere of the capsule towards its centre; while in posterior capsular cataract, they evidently branch out from the centre of the posterior hemisphere, following thus both the natural course of the arteries, and the directions of the inflamed vessels, as represented by Professor Walther.

"As to the state of the patient's vision who is affected with inflammation of the lens and capsule, where the disease is severe, vision is indistinct and confused, particularly when the eye is directed towards distant objects. Those objects which are nearer are seen as if through a fine gauze. This does not seem red, nor are objects tinged of that colour.

"This ophthalmia always observes a chronic course. It proceeds very slowly, and is attended with little or no pain. When pain does attend this disease, it is seated at the bottom of the orbit, in the forehead, or in the crown of the head. When the disease has continued for some considerable time, the blood vessels in the lens and capsule become varicose and remain so permanently. Professor W. observed the vessels of the lens in a middle-aged man, to remain in varicose state for whole year, without undergoing the least alteration. In one case, I have seen this disease followed by incomplete amaurosis, with tremulous iris. Effusion of fluid between the lens and capsule, and dissolution of the former, are not unfrequent consequences of inflammation of these parts; while in other instances, this disease would appear to go the length of suppuration, for we must consider inflammation as the cause of that variety of cataract which is called *cataracta cum bursa*, the opaque state of the lens and capsule being combined with the presence of a cyst contained within the capsule and filled with pus.

"The causes of this ophthalmia have not been sufficiently investigated. In one case which came under my care, it affected the right eye of a keen sportsman, and might perhaps be connected with the over-excitement which the eye may have undergone year after year at the shooting season.

"Inflammation of the lens and capsule approaches nearer to iritis than to any other ophthalmia. It is, however, much less acute in its character, and greatly less under the influence of treatment.

"Depletion, counter-irritation, and alteratives, are the remedies which suggest themselves as most likely to do good in the early stage of this disease, and tonics in the latter stages. I must confess, however, that this ophthalmia has in my hands proved the most obstinate of any. Even mercury, which, in the inflammatory affections of the eye the most similar to this, proves almost specific, appears to have scarcely any power over the inflamed vessels of the chrystalline capsule.

INFLAMMATION OF THE HYALOID MEMBRANE.

"The morbid states in which we meet with the vitreous humour, naturally give rise to the supposition that it occasionally suffers from inflammation. Its synchesis or dissolution, dropsical increase, state of atrophy, unnatural viscidity, change of colour, loss of transparency, and ossification, are so many morbid changes, which lead us to suspect the hyaloid membrane to be susceptible of inflammation. The vessels of the posterior hemisphere of the chrystalline capsule are derived from the central artery of the vitreous humour, and we can scarcely suppose the former to be affected with inflammation, without the latter participating in the same disease. Inflammation of the hyaloid membrane, however, has not been observed with sufficient accuracy to admit of description.

TRAUMATIC OPHTHALMIÆ.

"We have now seen how each texture of the eye suffers, in its own way, from inflammation, excited without any evident mechanical or chemical injury, the conjunctiva suffering puro-mucous and eruptive diseases; the sclerotica, rheumatic disease; the iris undergoing adhesive inflammation; the cornea losing its transparency, and becoming the seat of purulent infiltration and of ulceration; the choroid falling into a state of extreme varicosity; and retina losing its sensibility to light; every texture, in fact, suffering differently.

"Now, the inflammation which is excited by the evident mechanical or chemical injuries, the direct effects of which we have already considered, may attack one or several of these textures. We may have traumatic conjunctivitis, traumatic corneitis, traumatic iritis, &c., and it is remarkable, that traumatic inflammation, in any of the textures of the eye, imitates, so to speak, the ophthalmiæ which we have already considered. We meet with puro-mucous conjunctivitis, excited by injury, and we very often see pustular or phlyctenular conjunctivitis, brought on by the same cause. Traumatic iritis, the iritis, for example, which is so apt to occur after the operations for cataract, very closely resembles rheumatic iritis. The cornea, by traumatic inflammation, is rendered opaque, or becomes affected with onyx, or with ulceration; the lens also loses its transparency from the same cause, and the retina its sensibility.

"This observation, if duly considered, will throw a great degree of light on the treatment of the traumatic ophthalmiæ. Puriform inflammation of the conjunctiva, arising from injury is to be treated, in fact, exactly as we treat catarrhal ophthalmia. In traumatic iritis, the three great indications, to abate the inflammatory action by depletion, to dilate the contracting pupil by belladonna, and to promote absorption by mercury, are to be followed out exactly as in rheumatic or syphilitic iritis.

"For these reasons, I thought it proper to say nothing of the traumatic ophthalmiæ, till we had finished the consideration of the varieties of inflammatory disease, which are excited in the different textures of the eye by atmospheric and constitutional causes. Without a knowledge of these varieties of ophthalmia, we should be but little able to understand the inflammatory effects of evident mechanical and chemical injuries upon the several structures combined in the eye; but with such a knowledge, both the symptoms and the treatment of the traumatic ophthalmiæ become perfectly simple. These symptoms vary, no doubt, *ad infinitum*, in regard to severity, while in one case, a single texture, and in other cases, several textures of the eye will suffer; still, the invariable and peculiar physical and vital properties of each texture serve to produce, under whatever circumstances, or by whatever causes inflammation may be excited, the same essential phenomena.

"The most important general rule regarding the treatment of the traumatic ophthalmiæ, is, that we should be on our guard against effects which are apt to be produced, but which may not yet be present, and against effects implicating the interior textures of the organ, although the injury has appeared to be merely superficial. A considerable part of our treatment must be preventive. We must not wait to take away blood, till severe sclerotitis, with acute circumorbital pain, sets in. We ought to bleed from the moment of severe injury. We must not wait till the pupil is evidently closing; but apply belladonna, and prevent it. We must not wait till the iris grows discoloured, or lymph is effused into the pupil; but from the very first put the patient on calomel and opium, if we apprehend from the nature of the injury, that iritis is likely to be the result.

"We sometimes meet with severe sympathetic inflammation in the eye which has not received the injury.

"It is not unworthy of observation, that after all the other symptoms of severe inflammation of the eye following mechanical or chemical injuries have been removed by depletion, counter-irritation, mercurialization, &c. a very troublesome and obstinate intolerance of light, with epiphora, is apt to remain, not so much apparently from irritation arising from the state of the eye, as merely from continued and now habitual excessive activity in the lids and lachrymal gland. In such cases, in addition to the remedies recommended for epiphora at page 90,* I have derived advantage from the internal use of the extract of stramonium.

COMPOUND OPHTHALMIÆ.

"Strictly examined, few instances of ophthalmiæ will be found absolutely simple. Many are strikingly compound; for example, the catarrho-rheumatic, already described. Strumo-catarrhal ophthalmia is also very common, beginning as a slight puro-mucous conjunctivitis, but soon manifesting the signs of phlyctenular ophthalmia. In other cases, we meet with pustules of the conjunctiva, combined from the commencement with blenorrhœal inflammation of that membrane. Phlyctenular conjunctivitis with strumous iritis, strumous corneitis with iritis, and many other compound ophthalmiæ might be enumerated.

"The treatment of such diseases will, of course, consist in the combined use of the means, which are ascertained to be effectual in removing the separate or simple ophthalmiæ. The treatment necessary for strumous ophthalmia will be combined, therefore, with that for catarrhal conjunctivitis, in the strumo-catarrhal cases; while in the catarrho-rheumatic ophthalmia, the remedies for rheumatic inflammation of the sclerotica will be required along with those for blenorrhœal inflammation of the conjunctiva; and so on, in the other compound ophthalmiæ.

INTERMITTENT OPHTHALMIÆ.

"Although several interesting cases have been recorded of ophthalmiæ recurring in the same individual after longer or shorter intervals of time, yet I doubt whether there is sufficient ground to admit the existence of any disease of this kind so regularly periodic in its accession, as to warrant the appellation of *intermittent ophthalmia*. The pain which attends many of the ophthalmiæ, is undoubtedly subject to regular nocturnal exacerbations, but this does not entitle these disease to the appellation of intermittent. By an intermittent or periodical ophthalmia, I should understand one which recurred with considerable regularity at intervals of weeks or months, and apparently not from accident, but from concatenation with the revolutions of time; whereas, if we examine the cases which are recorded as being of this kind, we shall find that they are nothing more than instances of some particular ophthalmia recurring more or less frequently in the same individual, in consequence of his repeatedly exposing himself to the same, or to some similar exciting cause. The strumous ophthalmia, being that which is most apt to be renewed on slight exposures, will also more frequently than any other inflammatory disease of the eye appear to be periodic. The rheumatic, catarrho-rheumatic, and catarrhal will also be subject, from their ready occurrence in eyes once affected with them, to the same suspicion. I have frequently treated patients who at intervals of three or four months, or once a year nearly about the same season for several successive years, had suffered an attack of rheumatic iritis; but in every case of this kind, I have been able to trace the return of the disease to some new imprudence. In arthritic inflammation of the eyes, the periodic tendency will also appear to be very decided, for every attack of that sort leaves the eyes worse than before, and with a strong disposition to suffer again from renewed causes of excitement.

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* Our author has reference to emetics, purgatives, tonics, antacids &c.

"These remarks, will, I think, be confirmed by a careful perusal of the interesting narratives of[*] Dr. Curry and Dr. Bostock, both of whom had suffered from repeated attacks of severe ophthalmiæ"

In closing our Author's treatise upon the ophthalmiæ, or inflammatory diseases of the eye, I am induced to state briefly my views of bloodletting, and the collyria. The reader has perused in this work, and others, expressions having reference to the amount of blood to be drawn in some of the ophthalmiæ; one says deplete to fifteen ounces, another to twenty, at a phlebotomising.

Now it seems a more effectual and certain way in using the lancet, with the view of arresting an attack of ophthalmia; to be guided by the effects, the quantity of blood produces upon the vital functions, rather than to the quantity taken.

Were we to deplete to the quantum specified in some delicate subjects, we would in all probability, place the organ in a jepardous condition, by exhausting too much that nervous energy which is always required for the necessary tone and resisting quality of the fibre of the different tissue, or tissues. The serous vessels, consequently loose considerably their power to resume their wonted calibres.

On the other hand, in athletic subjects, were we in all cases to trust to the quantity drawn, be likewise suffering the organ to take on a greater extent of morbid action. For in cases of high conjunctivitis, sclerotitis, or iritis, when one copious depletion would put a stop to the inflammatory action in its incipient state and bring the disease under our control, we loose the moment by relying upon a certain amount to be drawn.

When then we wish to bridle effectually the impetus of the blood take off the general pethora of the arterial and venous systems, unload as speedily as possible the serous vessels, of their unaccustomed fluid, let us make the pulse our guide placing our patient in a sitting position, detract blood, *ad deliquium animi*, or till the pulse warns us to desist. By persisting in these measures rigidly we may cut short the rapid strides of a raging disease, which from its infancy threatened the organ with irreparable injuries.

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[*] History of a Case of Remitting Ophthalmia, and its successful Treatment by Opium; by James Curry, M.D. in the Medico-Chirurgical Transactions, Vol. iii. p. 348. London, 1812.—Case of a Periodical Affection of the Eyes and Chest; by John Bostock, M.D. in the same work, Vol. x. p. 161. London, 1819.

Local depletion, with cups or leeches, opening the temporal arteries, or jugular vein, in my opinion posses no more superiority in cutting short or relieving an attack of ophthalmia than the opening a vein at the bend of the arm or ancle joint. Is it by detracting blood from the vicinity of the inflamed tissue or tissues that we empty the serous vessels with the expectation no more red blood can course through them, or presumed we unload these vessels much faster than they can be filled by the adjacent trunks?

According therefore, to my views of the subject in question, and I think the unbiased practitioner will concur in opinion, that the practice of cupping or opening the vessels of the head or neck, an unnecessary procedure, and based upon fallacious principles. Among the collyria used with the object of giving tone to the serous vessels, and suppressing any morbid secretion from the conjunctiva the minerals undoubtedly possess some virtue.

But I believe, as much, if not more decided benefit can be obtained from those of an aromatic nature. In chronic forms of puro-mucous, conjunctivitis, or in the catarrhal, ophthalmia using these aromatic collyria after proper depletion, will cut short the attack.

Indeed these collyria prove highly effectual in cases where there exists morbid sensibility of the eye, without any appearance of conjunctivitis. In scrofulous cases their superiority over the minerals, is too obvious to the most superficial observer to require any explanation here.

The aromatic collyria which I request a trial of, are those made from sage, chamomile in particular, bathing the eye in a strong decoction of that medicine, will frequently relieve the sensation of sand and itching in the eye where zinc, laudanum, black drop and murias hyd. have failed; rose water adulterated with cloves or cinnamon, the strength of which the practitioner can use at his own discretion.

Ulcers of the Cornea.

The cornea is liable to adhesive inflammation, ulceration, and sloughing. The causes which gives rise to disorganization of the cornea, are attacks of any of the ophthalmiæ, nevertheless, foreign bodies entering the substance of that coat, thereby destroying its continuity of healthy structure, result frequently in the formation of an ulcer. We can find this morbid action rapid in its progress in individuals of a cachectic, or leucophlegmatic habit, more particular in whose constitutions lurks any syphilitic taint, or scorbutic diathesis.

We find authors affirming ulcer of the cornea to follow the formation of an abscess. Dr. Vetch says, "The little abscess of the cornea is attended with the same symptoms as the severe acute ophthalmia; especially with a troublesome sensation of tension in the eyebrows, and nape of the neck; with ardent heat, copious secretion of tears; avertion to light, intense redness of the conjunctiva, particularly near the point of suppuration"

Observes Scarpa, "Ulcers of the cornea has this in common with all solutions of continuity in the skin, where this is delicate, tense, and endowed with exquisite sensibility, that at its first appearance, it is of a pale ash colour; has its edges high and irregular, creates sharp pain; discharges instead of pus, an acried serum, and tends to spread widely and deeply."

Vetch "has observed, the appearance of ulceration varies according to the degree of apostemation or tendency towards it in the surrounding cornea. When this part is clear the case is doing well, but when opacity comes on, the ulcer is increasing. The soft middle lamina, is destroyed with great rapidity when the inflammation is violent, but as soon as the ulcer reaches the internal coat, it often proceeds no farther."

Says Mr. Traverse, "The term inflammation of the cornea must be understood as applied to the compound texture so denominated, and not to the lamellæ of horney substance, which has no vessels proper to itself, but derives them from the covering and connecting cellular tissue. These vessels nourish and preserve it in the condition essential to its economy. The crystalline humour is a simple texture, being wholly dependant on its capsule—as the nails, like the horse's hoof, are sustained by the lamellæ of the cutis in which they are implanted—or the hair by the back alone to which it is attached. It is rarely that red vessels are seen in the interlamellar texture of the cornea. Deposits of adhesive matter and of pus are frequent; the former most so; those of blood are rare, being only a result of severe injury, superadded to a state of inflammation. The cornea is rendered turbid by a conjestion in the vessels of its covering or connecting texture, and in this, and the case of intertitial inflammatory secretions, may, if in any, be said to be inflamed. But its subserviency in these processes to the conjunctiva and sclerotica, make the strict propriety of the term questionable as applied to the cornea lamella. It would be as incorrect to speak of an inflamed chrystalline, hair, or nail

“It rarely suppurates the ulcer of the cornea, begins not in abscess, but in a circumscribed deposite of lymph. or in pure ulcerative absorption without pus. In most instances, when of spontaneous origin, it begins in the interlamellar texture.

“When the conjunctiva has been detached, and the cornea deeply injured, as by a large spiculum, or by an ulcerated pustule of the corneal conjunctiva, the ulcer is filled by an inspipated mucous, or a little dirty white slough which may be picked or washed out, leaving a clean but rough fovea. The ulcerative process is unaccompanied by any appearance of coloured vesseels, and the adhesive process is, in many instances, conducted by colourless vessels. That the proper vessels of the cornea are capable of secreting adhesive matter, is proved by indeliable opacities both with and without breach of its texture, and the healing of interstitial ulcers, without any appearance of a coloured vessel. The organizing process is, however, in some instances, performed by coloured vessels. Where interstitial ulcers open externally, or pustules of the conjunctiva terminate in ulcers of the cornea, a narrow pencil of vessels is produced from the sclerotic conjunctiva to the breach which organizes the lymph deposited by the proper vessels of the corneal texture. I have sometimes observed, that the fasciculus of red vessels produced to complete the healing of an ulcer, opening externally, instead of coming from the nearest point of the sclerotic, crosses the greatest diameter of the cornea. I have never seen such a production of vessels without a narrow and very delicate substratum of recent lymph in their track; nor have I observed this peculiar deposit distinct from the production of vessels, prior to their appearance, but the vestige of it is discernable for a short time after the vessels have disappeared. In superficial lesions of the cornea, as from the insinuation of a foreign particle, the part is at once restored by adhesion, and marked by a superficial speck; it is only where the ulcerative process has supervened, and the conjunctiva is at the same time destroyed at the mouth of the fovea, that nature adopts the mode of healing by coloured vessels. Their office is, I think, limited to the organization of lymph deposited by the transparent vessels of the inter-lamellar texture; because when the ulcerative process is checked, the ulcer presents the signs of the adhesive action, viz: the marginal halo of lymph and the contraction and filling up of the fovea, before the vessels of the sclerotic conjunctiva are produced. In this state there is often a pause in the restorative process, when the stimulus of a single injection is followed by the appearance of the red vessels, the effect of which is speedily manifested by a reddish brown tint communicated to the deposit, which soon becomes distinctly vascular. In other words, the adhesive process is already commenced before this phenomina is observed. I have never seen the conjunctival fasciculus running to a transparent fovea. When the conjunctiva is entire, as in the interstitial ulcer, no red vessel appears, nor can be made to appear by stimulant injections, although they certainly quicken the adhesive process in such cases.

“From analogy, we are led to conclude that the vessels which secrete are distinct from those which organize the deposit, in open branches of all textures. An insulated pellicle formed upon the bed of an ulcer never becomes skin, but if it be connected by never so narrow an isthmus with the circumference, its organization is perfected. After the ligature of an artery, the barrier of lymph is deposited from the vessels opening upon the divided cellular membrane, as is evident from its origination within the fissure, but injections show that it is organized by the vessels of the lining membrane. The same fact is still more clearly demonstrated after the division of the sclerotic conjunctiva, for we may observe a distinct interval to transpire between the deposition of new matter in the breach, and its vascularization by ramuli from the divided trunks. This is in opposition to the opinion of Mr. Hunter, who cites the same example to prove the reunion of divided trunk or inosculation, an hypothesis which has been totally abandoned; since it has been ascertained that the permanent obliteration of arteries is the invariable consequence of a solution of their continuity, whether occasioned by wound or ulceration. I believe that in all parts the capillaries terminating upon the newly exposed surface, furnish the deposit, and that this becomes the matrix of new vessels opened from ramifications, under the extraordinary impulse consequent upon the obstruction of the trunk.

"The appearance of coloured vessels upon the conjunctiva of the cornea, is to be referred to one or the other following states, and may be classed accordingly. 1st. To the presence of adhesive inflammation excited by a pustolar ulcer of the cornea, as in the instance last described, and in that of acute interstitial ulcer opening externally, to the duration of acute strumous ophthalmia, in which the serous vessels of the cornea opened to red blood upon its entire circumference, in the form of radii conversing to a centre, to an equal extent of from one to two lines. In this case the cornea is more or less obscured. 3d. To a state of chronic inflammation, in which straggling solitary vessels, having a varicose appearance, run to one or more specks, or proceeding from opposite sides of the sclerotic conjunctiva, course over the opaque corner and freely anastomose upon it. This state is a common sequel of the supparative ophthalmia, whether accompanied or not with the janular conjunctiva tarsi, and which I have been accustomed to designate "chronic inflammation with vascular cornea."—It is commonly seen in cases of disorganized globe and spoilod cornea, from whatever cause."

"The first of these conditions I consider adventitious to the adhesive inflammation excited by the open of the cornea. It is proved to be so by a temporary deposition of a narrow layer of lymph, the direct course of vessels along it to the breach, their passage not always by the nearest route, i. e. from the nearest point of the sclerotica; the entire freedom of the cornea from blood vessels in *other* parts, and the spontaneous disappearance of the vessels and the lymph track after the healing of the ulcer. It is the most striking and beautiful instance we have of the handicraft of nature, of the production of vessels in inflammation for a specific purpose, and their gradual contraction to obliteration, the determination ceasing when that purpose is accomplished.

"The second and third description of appearances I consider to be produced by the continued visatergo overcoming the resistance opposed by the enfeebled tone of the vessels.

"The second is combined with recent and diffused nebula of the cornea, capable of removal by absorption The third is as often present with ulcerated specks as with simple opacities, which whether partial or complete, are seated in the corneæ texture, and have usually existed prior to the appearance of the red vessels, and neither the vessels nor the opacities spontaneously disappear. After repeated circular sections of the conjunctiva near the cornea, these vessels undergo contraction, especially under the use of styptic applications, as the lig-plumb. acetatis, and solutions of copper, alum, &c., that portion of the opaque matter which has been recently deposited, is at the same time absorbed. This operation seems to act beneficially in two ways; viz: by throwing up a barrier of lymph to impede the direct course of the vessels, and by diverting them to the purpose of its organization."

Our author says, (with respect to the production of vessels.) "When I speak of the 'production' of vessels I am not unaware of the ambiguity or impreciseness, at least, of the term, which is so different in a mathematical and a general sense. It would be wandering widely from the subject of this treatise, to enter in a discussian of the question, whether the phenomenon of organization is to be referred to an elongation of vessels by virtue of a force operating upon their elasticity or an occasional formation of ramusculi from continious branches. To divided vessels, the former supposition cannot apply, as their orifices, as before observed, become permanently closed. I may observe also, that elongation of vessels implies a looseness of cohesion in the textures in which they appear, which does not belong to the cornea conjunctiva in its healthy state; and the example which I have given in illustration of the formation of vessels, is strikingly opposed, in this respect, to the instance adduced of original vessels acquiring increased capacity, and being rendered, by the color of their contents, conspicuous. In the first, the corneal surface is otherwise healthy; in both the second and third, it is raised, thickened, and more or less disorganized.

"We are led by analogy to conclude that the effects of vascular conjestion from altexed or interrupted texture is only less in degree than that from complete obstruction in larger vessels; vix. the extension and elargement of collateral branches. Observe the vessels of the sclerotic conjunctiva in organic amaurosis; of the skin covering indurated tumors; and lastly, the communicating branches after the ligature of the trunk in aneurism. Mr. Hunter thought that the vessels might be formed in a patch of lymph independent of the circulation, says Mr. Hunter "I think I have been able to inject what I suspected to be the beginning of a vascular formation in a coagulum, when it could not derive any vessels from the surrounding parts. By injecting the crural arteries of a stump above the knee where there was a small pyramidal coagulum. I have filled this coagulum with my infection as if it had been cellular. but there was no regular structure of vessels."

Observes Mr. Traverse "then, likening extravation under inflammation, and the vascularization of the membranes of the check to this appearance of a self organized coagulum, "Mr. Hunter adds I conceive that these parts have a power of forming vessels with in themselves." "But where this coagulum can form an immediate union with the surrounding parts, it either receives vessels first at this surface or forms vessels first at, this union, which communicate with those of the surrounding surface."

Further remarks Mr. Traverse "the infinitely more probable theory of the derivation of vessels from parent branches for the organization of deposits, is supported by daily observation and satisfactorily explain the phenomena. That vessels are capable of producing their kind is as certain as the reproduction of bone, tendone, and other elementary textures. The dependence of one order, of vessels upon another is shewn by the existence of *vasa vasorum;* and it seems to me most probable that the vessels first seen in a patch of lymph are fabricated by the vasa vasorum, blood vessels and absorbents, of the terminal vessels of the wounded surface."

"The acute interstitial ulcer sometimes opens externally, by absorption of the conjunctiva, as well as of that portion of the lamellœ superjacent to it. Its figure and extent are determined by the deposit of adhesive matter. This is frequently crescentic and traverses a part or the whole of the diameter of the cornea. It is most frequently situated near the upper or lower margin of the cornea, but occasionally crosses the centre. Upon close examination, the conjunctiva will be found to be absorbed at the part opposite to the ulcer, and the exposed scabrous surface of the cornea renders the motions of the upper lid acutely painful. The deposition of the adhesive track precedes the appearance of red vessels, which are derived to it in one or more fasciculi from the sclerotic conjunctiva, and by which its healing is perfecting, as in the ulcer opening from the surface, before described.

"The terms onyx and unguis have been indiscriminately applied to extensive collections of lymph and pus between the layers of the cornea, and to similiar collections situated in the anterior chamber. They are applicable only to the crescentic interlamellar depositions above described. The acute interstitial ulcer in debilitated habits of body, or when it is produced by considerable violence down to the cornea, instead of opening upon either of its surfaces, spreads between its lamellœ, and in this case a considerable quantity of puriform matter is secreted. If it occupy a large and central portion of the cornea, it usually terminates by a slough of the entire membrane.

With respect to Hypopion. "When, as more frequently happens, the interstitial ulcer opens into the anterior chamber, it produces the hypopion, which is a mixed secretion of lymph and pus; the former flaky and inorganizable, and situated exterior to the fluid. The soft lymph pendulous from the mouth of the ulcer is often observed connecting the hypopion with it. I never recollect to have seen the puriform hypopion unaccompanied with ulcer penetrating the interior lamella of the cornea. In these cases, the integrity of the chamber is preserved, and the iris has no share in the restoration.

Of the Procedentia cornea. " In the process of an external ulcer to the interior of the cornea, and before it penetrates into the chamber, a remarkable appearance is occasionally presented viz. a transparent vesicle which fills the aperture, and is supposed to be the membrane of the aqueous humour. I have never seen this state maintained ; the prolapsus iridis follows in a few hours, notwithstanding the use of the lunar caustic and other stimulants. This has led me to question its being a distinct texture, and its appearance corresponds accurately to that of the innermost lamella, of the cornea, which after losing its support yields to the pressure of the humour, and assumes the vesecular form. The falling-in, or cup like depression of the continuous surface of the cornea, when the circumscribed interstitial ulcer opens into the anterior chamber, serves to confirm this conjecture. I have never seen the appearance which I have heard others describe as demonstrating the adhesive inflammation of this tunic, viz. colored vessels arborescent upon a deposit of lymph coating the interior of the cornea. If the observation be accurate, the case is very rare.

" Chronic interstitial ulcers from pure ulcerative absorption, succeed to acute inflammation, in which large quantities of blood have been lost, and occur frequently in children imperfectly nourished, or adults much debilitated from various causes. The cornea is perfectly transparent, but indented, like a bonce when struck upon a marble hearth, or pitted, according as the ulcers are diffused, or circumscribed; the vision is very slightly affected. Under nutritive diet, effective tonics, and moderate topical stimuli (vin. opii sulph. zinci) they become hazy; and this denotes the commencement of the adhesive action.

Acute Interstitial Ulcer.

"The acute interstitial ulcer cannot be treated distinctly from the adhesive inflammation; it is a sign only of the inflammation which constitutes the disease. In proposition as this is reduced, its disposition to extend is checked, or we are enabled to employ auxiliaries to that end. But in favourable circumstances of constitution they are not wanted. Healing is a spontaneous action, vicarious with destruction, and commences on the arrest of inflammation.

Abscess.

"A large collection of matter in the cornea, whether the puriform onyx, or central abscess requires, at the same time, a supporting constitutional treatment, mild cathartics, and the application of blisters; calomel should be avoided, as in most instances where ulceration is present. The puncture of the cornea is seldom practiced with advantage." By the means above named, I have seen large effusions absorbed, and no trace left of their existence.

Hypopion.

"When the hypopion is so large as to rise towards the pupil, and the ulceration of the cornea is extending, I think its discharge by section, near its margin advisable. If not too long delayed, the ulcerative process is checked by it, which would otherwise run into sloughing, and the cornea recovers with only partial opacity and disfigurement.

Nebula and Onyx.

"It is only necessary to observe, that the practice employed to reduce inflammation is then most strongly indicated, when the cornea is rendered opaque, or presents an onyx of adhesive matter.

Superficial External ulcer.

"The superficial ulcer is commonly attended with much inflammation of the conjunctiva, and by continuance, of the sclerotica. The eye is very irritable to light, and the sensation of a foreign particle in the motions of the lids acutely painful: The pain is often spasmodic, and relieved by profuse lacrymation at intervals. Opium should be so combined as to operate on the skin, and the bowels must be kept freely open. Touching the ulcer with a fine pointed caustic pencil, or the solution of argentum nitratum is the best local treatment; much superior as an anodyne, to sedative lotions, warm fomentations afford temporary relief. It will be found advantageous, if not indispensable to prevent relapse, to affect the system with mercury when the inflammation of the sclerotica is intense. The cicatrix being confined to the superficial lamella is of very inconsiderable density; so as in time to be scarcely perceptible, and in children to wear quite away.

Indolent and deep Sloughing Ulcer.

"The indolent and deep sloughing ulcer may be touched once, or oftener, with the caustic pencil, or washed once a day, or oftener with the solution. The cleansing of the ulcer and the opaque adhesive circle is the sign for a less frequent use of it, and the deposition of new matter, undergoing a vascular organization, renders its further use hazardous. The occasional use of leeches is often a necessary accompaniment to this treatment. The administration of tonics and sedatives is at the same time essential."

Remarks.

In treating ulcers of the cornea much knack of skill and judgement are required to arrest as quickly as possible the ulcerative process.

To accomplish this desirable end, the patient's constitution should be well examined into; and if he labours under a syphilitic taint, a scorbutic or scrofulous diathesis, local application will avail but little, until such remedies are speedily given to change that state of the constitution, which if not attended too, must act as a great barrier in the way of the practitioner in effecting a premature cessation of the ulcerative process.

It appears the nitrate of silver in a solution form is the best local remedy applicable to ulcerations of the cornea after touching the ulcer we are recommended to bathe the eye in some tepid milk and water, added to which a few drops of the vinum opii, will alleviate considerably the pain.

Using the caustic pencil to an ulcerated cornea, caution must be used not to apply it too often. Perhaps one single touch of the pencil will suffice for a healing of the ulcer. Scarpa advises the caustic pencil to be applied until a slough is formed. Vessels carrying red blood from the sclerotic conjunctiva into the ulcer should not be divided. The conjunctivitis which attends some ulcers of the cornea, requires active antiphlogistic treatment, such as bleeding at the arm, with cathartics, and anodyne medicines.

Opacities of the Cornea.

Nebula is a term used for opaque cornea, we may have opacities of the cornea, not unfrequently following attacks of the ophthalmiæ, injuries done to the eye by extraneous substances. Opacities of the cornea, may depend upon either a disorganization of the cellular tissue which unites one lamellæ to the other, or upon a change of healthy structure in the lamellæ. Dr. Frick says, "often, indeed, it is produced by the more condensed state, or increased secretion of the natural halitus, which is found to fill this delicate structure. If the inflammation causing such deposition, has been more violent. the effusion is rendered proportionably dense, and a species of pseudo-membrane is formed, in lieu of the cellular net-work; or this structure is entirely destroyed and absorbed, and the lamellœ are brought into intimate and direct union with each other. In these cases, the texture of the parts is sometimes totally altered, without being followed by any breach of substance. Examples of a similar kind are met with in other structures of the body, as in the pleura, which is sometimes converted into bone, without the least ulceration."

An attack of aquo Capsulitis may result in opacity of that portion of the membrane in contact with the cornea, and vision be abolished. Opacities or specks of the cornea. are devided in several species. Beer terms those opacities caused by an altered state, of the interlamellar secretion. *Macula* corneæ, *simplex, obscuratio*; (nebula, nephelium, nebecula,) others, the consequence of the production of a pseudo membrane, *leucoma,* Where the lamellœ become united together or to the anterior membrane of the cornea, *albugo,* or *cicatrix.*

A simple opacity of the cornea is characterised by a slight cloudiness of a certain portion or the whole of the cornea. That opacity which goes under the appellation of a film, appears to have its seat solely in the conjunctiva, depending upon disorganization of that tissue without any change of structure in the lamellœ.

"In *leucoma* the opacity is more circumscribed, and of a whitish, chalky, or pearl colour. If it be deeply seated, it will assume a polished or shining lustre; if more superficial, or beneath the conjunctiva, the colour is more dull. In both cases, there is a consideradle degree of nebula surrounding the opacity.

"The *cicatrix* differs no less in form and colour from the two other varieties, than in the cause which has produced it. Being always the consequence of wound or ulcer of the cornea, its form is infinitely varied. Not unfrequently the iris will be found united with the cornea at the point of the cicatrix, so that the pupil is considerably distorted or drawn from its natural position. The cornea is sometimes seen completely studded over with these cicatrices, so that it has lost in a great measure, or altogether its transparency and convexity. This form of the disease professor Beer has very justly styled *phthisis corneœ.*"

Mr. Wardrop "conceived, that certain opacities are produced by an increase in the quantity of the contents of the eye ball, and not by the deposition of an albuminous fluid in the textures of the cornea, as takes place in the common speck. He considers this fact proved, by cases in which the cornea regained its transparency, soon after the aqueous humour was evacuated."

Treatment. When the opacity seems to consist in a disorganization of the conjunctiva, covering the anterior portion of the cornea, it may be removed by touching the opaque spot with a solution of the nitrate of silver once or twice a day in conjunction with purgatives and counter-irritants. Emetics prove beneficial. All vessels running from the conjunctiva into the opacity should be divided. There are other remedies used in this opacity, such as borax and loaf sugar mixed together, blown into the eye, levigated glass and calomel blown through a quill upon the opaque spot. However, it appears these latter remedies are much inferior to the lunar caustic solution.

When the opacity consists in a disorganization of the interlamellæ tissue, the blue pill given until the gums are made tender, followed by counter-irritants and the lunar caustic solution. Vinum opii dropped occasionally into the eye.

Mr. Traverse says, " The gangrenous opacities of the cornea produced by lime or other substances destroying its texture, are sometimes superficial and defined in extent, and a process resembling exfoliation ensues. More frequently this disorganization is integral and complete. The cornea, disorganized by acids, is rendered instantly opaque shrivelled, and of a yellow colour, almost resembling a piece of wash leather. "In general, opacities which have a recent diffused semi-transparent character (nebulous) admit of absorption; not so those in which the interstitial deposition has been abundant and of long standing, and the lamellæ are compacted, owing to the entire obliteration of the cellular texture; or in which a new portion of cornea is formed, he further says I have seen several cases of the conversion of the conjunctiva into a skin, rugous and opaque knitting the lids close to the globe, so as to obliterate the sinus palpebrales. I have called it cuticular conjunctiva. In these cases there is no secretion of tears, I have had occasion to observe the accession and progress of this disease in early and advanced life, among the sequelæ of chronic inflammation of the conjunctiva, and am disposed to consider it depending on a obliteration of the ducts of the lacrymal gland.

" All stimulant substances, not escharotic, applied to remove opacities of the cornea, act, in the same manner as rubefacients upon the skin; they excite a temporary vascular action, which is followed by a corresponding excitement of the absorbents, I have often seen an opaque portion of the cornea cleared by a puncture with the couching needle."

The following ointments are recommended for opacities of the cornea. R. Sal. corn. Cervi. gr. xij. Fell. Taur. Dr. j. Mel. Despum. Dr. iii. M. Exactissime. (Richter.) R. Liquor. Ammon. caust. gtts. x. Olei. Nuc. Jugland. Unc. semis. M. (Graefe.) R. Butyr. recent. insuls. Dr. ij. Mercur. precip rubr gr. xv Tutiæ. pptæ. gr. vi. M. exactissime. (Beer.) R. Butyr. recent. insuls. Ceræ. flavæ Dr. i. Mercur, prec. rub. M. ut Ft. unguentum. (ibid.) R. Mercur. sublim. corros. gr. j. opii. colat gr. viij. solve in Aq. Rosar. Unc. ij. (ibid.)

The above ointments are to be applied to the opaque cornea by means of a camels hair pencil. Ointments are considered as highly efficacious in opacities of long standing, and more especially when they are connected with a cachectic constitution, and which have a dull white or pearly colour.

Pterygium.

From frequent attacks of conjunctivitis result occasionally cases of pterygium. The disease may arise from injuries done to the semilunar fold or lachrymal caruncle. Pterygium or winged film consists in a fasciculus of vessels running from the semilunar fold to the edge of the cornea, at other times this elongation of vessels will seem to be preceded by a deposit of a yellowish point of lymph at the edge of the cornea, into which the vessels terminate. The vessels may remain in this position for months or years, but now and then they ramify over the cornea, thereby impairing or abolishing vision. Nothing short of an operation will remove the disease. The surgeon elevates the lid just as if he were going to operate for cataract, and with a common thumb lancet divides freely the bundle of vessels, making the incisions midway between the cornea and semilunar fold. This simple operation may answer perhaps in the majority of cases.

Mr. Traverse says "the fleshy pterygium is sometimes a chronic, and even a stationary condition of disease producing no inconvenience, nor threatening to interfere with vision.

"Whenever this is the case. I am decidedly of opinion that it should be let alone. When, by its progress, it is encroaching upon the sight, it should be raised by dissection as close as posible to the margin of the cornea, and the relaxed portion of the membrane removed by an incision midway between the base of the pterygium and the cornea, and concentric to that membrane, I have experienced the inconvenience pointed out by Professor Scarpa of carrying the excision to the caruncula, viz. the deposit of lymph in the site of the cicatrix becoming united with the caruncula, and forming a hard frenum or cord which prevents the abduction of the eye, I am also satisfied that the disease is permanently arrested when the connection with the cornea is dissevered. In this operation I prefer the cornea knife to the scissars. It is inadmissible to interfere with any portion of the pterygium that may have encroached upon the cornea. It may be necessary to repress the tendency to reproduction by the application of the caustic pencil to the section of the tumour; but the frequent or diffused application of escharotics is objectionable, as a morbidly thickened and tubercular state of the membrane is the consequence of the irritation thus excited. The treatment of the membraneous peterygium consists in nipping up a crescentic portion of the opaque membrane as near as convenient to the cornea, and freely exercising with a pair of curvid scissars. The extremities of the line of excision both in this and the former species should extend beyond the diseased part.

Prolapsus Iridis.

Prolapsus iridis is by some writers denominated staphyloma iridis. The characteristic of the complaint is a tumour formed by the protrusion of a certain portion of the iris through an opening in the cornea. It is of different sizes, that is, according to the extent of breach in the cornea, at one time it will be as large as a pin's head, and at another the size of a common shot; hence the different names as my myocephalon melon, hylon, &c. Two or more openings in the cornea, may exist at the same time and allow a protrusion of as many parts of the iris. But there is rarely seen more than one opening in this membrane. When the patient is labouring under prolapsus iridis he complains of pain of a short lancinating kind, as if a needle had been thrust through his eye, with a sensation of tightness and rigidity of the eyeball, however the appearances are sufficiently diagnostic to discriminate this disease from any other. The pupil is drawn out of its natural position either to one side or the other, or towards the opening where the protrusion happens. The pupil being displaced, vision is considerably impaired, inflammation and epiphora succeed which renders the eye excessively sensible to the rays of light. If the protruded iris is suffered to remain for any length of time, it hardens, and becomes indolent or disappears, and in course of time nothing can be seen but a jet black point in the cicatrix of the cornea. The pupil now becomes oval in a vertical or horizontal manner, in consequence of the small portion of iris left, becoming impacted in the cicatrix of the cornea.

The generality of oculists advise that the prolapsed portion of the iris be returned to its natural position, this can be done by means of a probe or ivory stylet or the common curetto, but if the protruded portion becomes stragulated in the aperture, and adhesion has taken place between these two coats, the wound in the cornea should be touched if not likely to heal, with lunar caustic in solution; this can be done by a camel's hair pencil: a permanent adhesion forms then between the cornea and iris. But where the case is recent, the prolapsed portion should be replaced, followed by belladonna upon the lids, touching the breach in the cornea once or twice with a solution of the nitratum argentum say two grains to the ounce of pure water. The patient should be confined until the aperture in the cornea has closed. Should much pain or arterial excitement ensue, the lancet with the vinum opii may be administered, keeping the bowels open at the same time with epsom or glauber salts.

Extirpation of the Eye Ball.

There seems but little discrepency of opinion at the present day in removing the eye ball. Bartisch, "is thought to be the first who performed this operation, he used an instrument shaped like a spoon having a cutting edge, with which he scooped it out. Hildanus. thirteen years succeeding upon removing an eye, found the inconvenience arising from the spoon of Bartisch by using it upon animals, contrived in its place a single curved knife with a blunt extremity, which he used with great success. A hundred years afterwards we discover, Job I Meekren, a Dutch surgeon, using the spoon of Bartisch in preference to the knife of Hildanus. Tulpius and Plempius, rejected the operation altogether. The French surgeons use the knife and curved scissors."

Mr. Traverse says. "The extirpation of the eye. when that operation is determined upon, is most conveniently performed with a straight double-edged knife, which is to be employed for the purpose of freely dividing the septum of the conjunctiva and oblique muscles, so as to separate the globe and lachry mal gland from the palpeoræ and base of the orbit. When this is done, the globe admits of being drawn gently forward by a ligature previously passed through its anterior segment. A double-edged knife, curved breadth-wise. should then be introduced at the temporal commissure of the lids, for the purpose of dividing the muscles, vessels, and nerves. by which the globe remains attached. with greater convenience and despatch. The hemorrhage is repressed by means of a small portion of fine sponge introduced into the orbit, and a light compress of linen should then be laid upon the lid supported by a roller. The sponge should not be suffered to remain longer than the following day, when a soft poultice in a muslin bag may be substituted for the compress. An opiate should be given at bed time.

"The practice of cramming the orbit with lint or charpie, and leaving it to be discharged by suppuration is objectionable. I knew one case in which this measure was followed by a most extensive suppuration with the cavity, and by abscesses in the neighbouring integuments of the lids and forehead; and another has been communicated to me, in which its ill effects were evident.

"I once lost a patient, a middle-aged country man, otherwise in health, within a fortnight after this operation, owing to a suppuration of the dura matter, on the same side of the head. The attack of inflammation was sudden and rapid, commencing about a week after the operation, and ushered in by a severe rigor after exposure to cold, in the square of the Hospital;

an imprudence quite unauthorised. There was no continuity of inflamed surface to account for this, although the morbid appearances were confined to the membrane of the corresponding hemisphere. I have performed the operation many times without any serious after-symptom."

Extraneous Bodies.

The practitioner is not unfrequently called upon to examine the organ of vision for casual injuries.

A speculum of iron or steel has entered the aqueous chambers or it may be inbedded in the substance of the cornea or striking that coat obliquely pass one or two lines between its lamellæ. These extraneous bodies are some times so small that they cannot be detected without a careful examination.

If the patient is placed so as to allow a good northern light to fall upon the eye, elevating the upper lid and by the use of a magnifying glass the particle will be seen. Perhaps it may not be discovered by looking in the front of the eye, it then becomes necessary to examine the cornea in an oblique direction.

The practitioner takes a common thumb lancet, and with the point removes the particle, keeping the flat surface of the instrument presented to the cornea.

A metallic substance becoming fixed in the aqueous chambers and not larger than a radish seed, will be dissolved by the aqueous humour, but when larger, the cornea had better be opened and the body removed This can be done by making an incision at the temporal side of that coat, introducing a delicate pair of forceps, the body is taken hold of and gently brought through the incision. The same after treatment is required in this case, which was recommended for cataract.

Pieces of woolen or wood having penetrated the cornea and becoming lodged in the aqueous chambers require to be removed as speedily as possible, for the aqueous humour exerts but little solvent power of any other substance saving those of a metallic nature.

Children meeting with these accidents are very intractible to the operator. If an anodyne is given them an hour or two before the operation and while they are laying in a comatose state, the extraneous body can be removed with more facility.

Incisions of the cornea result in opacity, they are to be treated by the antiphlogistic regimen, applying to the eye upon the receipt of the injury, a crumb of light bread, soaked in lead water, renewed for every four hours.

When the iris protrudes through the cornea the consequence of an incision should be returned by a probe, or if the case is recent requesting the patient to open his eye before a strong light commonly produces a contraction or retraction of the iris.

The iris being injured by any substance, the lids should be kept constantly moist with belladonna, and the most rigid antiphlogistic regimen persued in.

An incision of the cornea may be of such a size, as to admit a protrusion of the internal parts of the eye with the iris Mr. Guthrie advises to excise the protruding parts; perhaps it would answer just as well to push back into the eye ball the substance. By so doing we may preserve the former size of the eye ball.

Half or two thirds of the cornea may be excised from the sclerotica. The cornea should be replaced as accurately as possible, apply a fold of lint made moist with lead water and bandage over the eye, round the head.

Blows will cause an effusion of blood in the aqueous chambers. When an absorption does not take place in four or five days, the cornea should be opened, and the humour suffered to escape. A blow may cause some organic or functional derangement of the retina. In this case the antiphlogistic treatment is obviously demanded.

The chrystalline lens may be penetrated by a speculum of metal, and vision be destroyed, or an absorption of that body will succeed with a restoration of sight.

Substances having entered the sclerotica or cornea which may be bearded, requires for their removal that the wound be enlarged by the point of the lancet, giving free escape to the body, then with the point of the instrument or a delicate pair of forceps, they can be extracted. Injuries having been inflicted upon the cornea by rough or sharp instruments penetrating the iris, result sometimes in loss of vision. A small shot may have passed through the scleroticcoat entered the vitreous humour destroying its natural consistency and transparency rest upon, or striking the retina, produce likewise total loss of vision with apparently a healthy aspect of the anterior parts of the eye. When an instrument has passed through the cornea and iris, iritis is the consequence, and requires the most rigid depletory measures, with the use of belladonna to prevent a closure of the pupil.

DISEASES OF THE LACHRYMAL APPARATUS.

From daily observation we perceive on the lachrymal apparatus, the seats of troublesome diseases. Any morbid action going on in these parts is generally succeeded by, or conjoined with some functional or organic derangement of the eye ball.

Entropeon.

An inversion or turning in of one or both tarsi upon the eye ball, is one among the most distressing and destructive diseases. If measures fail in arresting a continuation of this malformation in its incipient stage, a high state of conjunctivitis ensues with chemosis, followed in some cases by a speedy disorganization of the cornea, terminating in little less than irreparable opacity of that tunic. These morbid changes may take place in some subjects earlier than others.

Where the cilia are turned in upon the eye ball without any unnatural position of the tarsal cartilages, the disease is called *trichiasis*, and if there be a double row of cilia inverted *distichiasis*, many authors however deny the existence of such a form of the disease. Professor Beer speaks of cases where this pseudo-cilia was manifest.

When the upper or lower tarsal cartilage is turned in upon the eye ball, the disease may be termed complete, but only a portion incomplete entropeon.

Symptoms.—It is natural to suppose such an inversion must create the most excruciating pains at every motion of the lid or lids, with quick pulse, furred tongue, violent pains in the head and back, and copious lachrymation.

Causes.—Injuries inflicted upon the lids, ophthalmia tarsi. The disease not unfrequently succeeds or accompanies some of the ophthalmiæ, more particular of the scrofulous or variolus species. A morbid condition of ciliary glands, or Meihomian, follicles resulting in a peculiar thickning of the palpebral conjunctiva, may give rise to the disease.

Treatment.—In the early stages of entropeon, the antiphlogistic treatment persued in, may arrest the disease. Depleting from the arm, with tepid aromatic collyria, and plucking out all the inverted cilia with a pair of forceps. But when there is a complete inversion of the upper or lower tarsal cartilage, nothing saving a speedy removal of these catilages seems likely to save the eye ball from destruction.

Various methods have been devised for the removal of these cartilages, as incising and excising certain parts of the diseased lid or lids. An oblong oval shaped portion of the integuments is removed from the lid immediately opposite the inverted cartilage, this is done by the forceps of Bartisch, and the common curved scissors. The surgeon commences by raising the integuments of the palpebra with the forceps and excising the skin by a single stroke of the scissors. The lips of the wound are brought together by adhesive stripes, and a compress of lint or bandage is applied as after the operation for cataract. This operation is performed with the view to bring about an evertion of the tarsal cartilage. But this method will not answer in inveterate cases, and should never be trusted to. It therefore becomes necessary to make use of a more radical operation.

The operation as performed by Crampton, Gurthrie or Saunders, is to be resorted to.

Crampton's method: "The eye lid being well turned out by an assistant, the surgeon with his lancet should divide the broad margin of the tarsus completely through, by two perpendicular incisions, one on each side of the inverted hair or hairs. This being done, the extremities of these perpendicular incisions should be united by a transverse section of the conjunctiva of the eye-lid. The portion of cartilage contained within the incisions can then if inverted with ease, be restored to its original situation, and retained there by small stripes of adhesive plaister."

"Dr. Jæger, of Vienna, instead of removing the tarsus, takes away with a knife or pair of scissors, the external border of the eye lid only, or that portion which contains the cilia; and this practice has obtained the sanction of professor Beer."

Mr. Saunder's method: "A piece of thin horn, or a plate of silver, having a curvature corresponding with that of the eye-lid, is to be introduced, and its concavity turned towards the globe, within the eye-lid, which is to be stretched upon it. An incision is to be made through the intiguments and orbicularis palpebrarum immediately behind the roots of the cilia to the tarsus, and should extend from the punctum lachrymale to the external angle.—The exterior surface of the tarsus is then to be dissected until the orbital margin is exposed, when the conjunctiva is to be cut through directly by the side of the tarsus, which must now be disengaged at each extremity, the only caution necessary being to leave the punctum lachrymale uninjured. Nothing can be more simple than this piece of dissection; and if any embarrassment arises, it is from the hemorrhage of the ciliary artery, which must necessarily be divided, and this hemorrhage renders it somewhat difficult to observe the punctum, when one wishes to divide the tarsus by the side of it. If the operation itself be simple, the subsequent treatment is still more simple than the operation. In a word, no dressing is necessary, and it is only advisable to cover the eye, to conceal a disagreeable object from the patient's friends. In a few days an union will have commenced between the section of the intiguments and conjunctiva, and the elevation of the skin will go on like that of the original eye-lid, less complete indeed, but sufficiently so to leave the pupil clear during a moderate elevation of the eye. In all the patients on whom I have *operated*, a fungus of considerable size has sprouted from the centre of the section. This must of course be managed by caustic or the knife; and the latter is to be preferred, because it excites no subsequent irritation."

In cases of incomplete invertion where there is only a small portion of the tarsus inverted, it can be excised in the same manner, taking care to remove only the inverted cartilage.

Mr. Guthrie recommends the following. "The *head* being properly supported, the eye lids are to be gently separated; the patient is desired to refrain from making any effort whatsoever, and the surgeon is to wait until he sees that the lids are perfectly quiescent. A small narrow knife, or one blade of a blunt-pointed scissors, is then to be introduced, close to the external angle, and a perpendicular incision made of from a quarter to a half an inch in extent, or of a sufficient length to render the eye lid quite free. The quiescent state of the lids, and especially of the orbicularis muscle, enabling the surgeon to cut closely to the angle, than he otherwise could do, and thus to divide the ligament, or at least the extremity of the cartilage. Another incision is to be made in a similar way at the inner angle, but this should not include the punctum lachrymale, as I have never found it necessary to do so, and although the tears may continue to pass through the lateral canal into the sac, when the punctum has been included in the excision, they do not do so with equal freedom, and there is some observable deformity. The length to which the perpendicular incisions at both angles ought to extend, must now be decided upon by the appearance of the part; they must be continued if necessary, by repeated touches with the scissors, until that part of the eye lid containing the tarsal cartilage is perfectly free, and is evidently not acted upon by the fibres of the obicularis muscle which lie upon it. This frequently causes the incisions, and especially the internal one to be longer than is usually supposed to be necessary. The part included in the incision is now to be completely everted, and retained by the forefinger of the operator's left hand, against the brow of the patient, when if any lateral attachment be observed acting upon, and drawing, or confining the lid, it is to be divided, which is in fact, still elongating the incision. On letting the eye lid fall on the eye, the edge of the tarsus and the hairs will frequently appear in their natural situation, in consequence of the relaxation of the angles, which bound them down; but if the tarsal cartilage has become altered in its curvature, this will be immediately perceived, it will turn inwards at the ciliary edge, and be completely bent at its extremities, more especially at the inner one, where it is most powerfully acted upon by the musculus ciliaris On desiring the patient to raise the lid, he readily attempts it, but the action of the levator, in such cases of vicious curvature, causes the cartilage partly to resume its situation, and on examination the curve will be observed to be so permanently vicious for about the eighth of an inch at each extremity, and especially at the inner, that it cannot be induced to resume its actual situation. When this is the case, the cartilage is to be divided, exactly at the place where it is bent, in its length, and in a direction at a right angle with the perpendicular incision. The portion thus slit is only connected with the common intiguments of the eye lid; and although this incision scarcely exceeds one, and never two eighths of an inch at both extremities, and in general is only necessary at the inner, it enables the surgeon to move the altered curvature of the part.

He further remarks: "The operation being thus far accomplished, a fold of skin is to be cut away from that part of the eye lid included between the incisions; three or four ligatures are then to be introduced, and the divided parts, from which the fold has been removed, are to be neatly brought together by the ligatures, each of which ought to be twisted, and then fastened to the forehead by several short stripes of sticking-plaster, the ends being turned over the plasters near the hair, and retained in that situation to prevent their slipping. In raising the fold of skin care should be taken to do it regularly with the fingers. It is also essential to the success of this part of the operation, that it is done as close as possible to the margin of the eye lids. It may then be grasped by the forceps of Beer, which have tranverse pieces slightly curved, for the purpose, at the extremities, and close with a spring The piece thus included, which need not be large, may be cut away at one or more strokes of a large pair of curved or straight scissors. The ligatures should be inserted first at each angle; and when the vicious curvation is considerable, I not only pass it through the skin, but take care that the *internal* one shall include, at its lower part, the *outer edge* of the margin of the eye lid, which, from its firmness, retains that ligature much longer than those which pass through the skin only, and tends to prevent the possibility of a relapse. The ligatures thus placed, are to be equally drawn up on the forehead, until the eye lid is *completely everted,* when they are to be fastened as directed. In order to prevent any attempt at union, but by granulation or a filling up of the incision, the edges are to be slightly touched with the sulphas cupri; the eye and eye lids are now to be carefully cleansed; a piece of lint smeared with the unjuentum cetacei, is to be placed upon them; a small compress is to be put under the edge of the eye brow and orbit; a retaining bandage covers the whole, and completes the different steps of the operation. When the disease is not considered of an inveterate nature, the ligatures may be introduced through the fold of the skin, without cutting any portion away. They give little additional pain, and are infinitely more effectual than any other suspensorium with which I am acquainted, and they ought to be assisted by strips of adhesive plaister placed between them. The operation, accomplished with all the care I have described, will still fail, if equal attention be not daily paid to the subsequent dressing, on which, indeed, more depends than on the operation itself, so much, indeed that I am disposed to consider inattention to it the most certain causes of failure. The patient is to be kept quiet until the next morning, when the bandage and lint are to be removed, the eye carefully fomented and cleansed with warm water, and the dressings replaced. On the second day, great attention must be paid that the ligatures keep the lid sufficiently raised; and if any union has taken place, by adhesion at the angles of the incisions, it must be broken through with the probe. On the third day, the plasters attaching the ligatures to the forehead will in general require to be exchanged. The ligatures themselves must be supported by straps of plaster placed vertically between them, the edges of the incision should again be touched with the sulphas cupri, or seperated by the probe. The greatest part of the cure now consists in causing the incisions to be filled up by granulation only, so that the eye lid may be lengthened as much as possible, and which can only be effected by a continuation of the means indicated. In a few days more, and especially by the continued elevation of the lid, the ligatures cut their way out, during which period the eye lid is gradually lowered, and by the time the incisions have filled up, it will have resumed its natural situation." This operation can be done on the lower lid.

This operation may prove successful in many cases I have no doubt, but in a firm and permanent curvature of the cartilage, there is no one in my opinion which is so likely to prove quickly effectual as Mr. Saunder's. In slight cases I would suggest simply making one perpendicular incision in the centre of the lid, that is dividing the lid nearly in two, to within two or three lines of the commissure of the conjunctiva, everting each side of the lid and incising freely the conjunctiva. For in many cases entropeon will be found to originate from a thickened callous condition of the palpebral conjunctiva succeeding attacks of conjunctivitis. The same streps can be used in this operation as is in that of Mr. Guthrie's.

Ectropeon.

This disease consists in an evertion or turning out of one or both eye lids. However, it is seldom that both lids are everted at the same time. The lower palpebra is more commonly affected than the upper.

Appearances.—In some cases the conjunctiva on the inverted palpebra is swollen, and presents a granulated aspect, in others it has a smooth surface. The cilia in those of long standing fall out, the external tarsal margin becomes excoriated, or a state of ulceration ensues. The disease may exist only in a partial degree with a slight evertion when the punctum lachrymale performs somewhat their office, but in complete evertion the different secretions of the eye fall down over the cheek.

Causes.—This disease is most generally the sequela of conjunctivitis, sometimes follows ulcers, burns, scalds, blows, or incisions on the lid. The cicatrix in forming consequently draws the lid down upon the cheek. Elderly persons are more subject to this disease than the young.

Treatment.—When the disease originates only from a thickened condition of the conjunctiva, and is of recent date, it may be cured by incising freely the conjunctiva, followed by the application of the lunar caustic solution to the incised membrane, taking lastly three or four adhesive strips, and running them from the lower portion of the lid over the forehead, which will cause the lid to resume its wonted position. The strips should not be removed under three or four weeks.

The inner surface of the diseased lid should be injected for every second or third day with the solution of the nitratum argentum.

When ectropeon results from a cicatrix, nothing short of an operation will suffice for its cure. The one commonly resorted to, is that of removing a portion of the everted lid in the shape of the letter V. This can be done by introducing, if possible, under the everted lid a piece of thin smooth ivory, or the point of the spatula will answer, taking then the iris scaplel and cutting away the above named portion of the lower lid. this should be done from the centre of the lid, finishing the operation by using adhesive strips and sutures to bring the edges of the divided tarsus and lid in apposition, and retain in this position by a compress of lint smeared with a little simple cerate, running a roller bandage round the head.

Dr. Vetch says, "I take the opportunity which the exposed state of the surface of the palpebra presents of beginning the cure of the granulated state of the conjunctiva by a very light and gentle application of the nitrate of silver. The everted portion is to be returned, and secured in its place with a compress, and strap of plaster or bandage Every time the eye is cleansed, the same things are to be repeated. In the course of a few days the tendency to protrude will disappear, and generally at the end of a fortnight the patient may have so far recovered the use of the muscles of the part, as to be able by their means alone, to raise or open the eye lids at pleasure. Whereas if attention is not given to relieve the strangulation, which takes place every time the membrane protrudes, it becomes a disease of many months' duration, and the eye may be destroyed in consequence, although it might have escaped the violence of the acute stage of the preceding ophthalmia." Mr. Stratford says, "The means applicable to the cure of that species of evertion proceeding from a wound or large ulcer, must differ according to its extent. If the contraction and consequent eversion is slight, we may, by dividing the cicatrix, and causing it to granulate from the bottom of the wound, sometimes cure the complaint. To accomplish this we must hold apart the lips of the wound by adhesive straps and frequently touch the parts with the sulphate of copper.—But if the complaint should have proceeded a greater extent, and the whole of the lid be everted, we must not only divide the cicatrix, but should also cut out an angular piece of the palpebra, and bring its two surfaces in direct opposition. By this means we directly contract the length of the palpebra, and afford it support. The two surfaces are to be held in contact by a ligature so as to cause as speedy a union as possible."

Epiphora.

This disease is characterised by a trickling of the different secretions of the eye, over the cheek; together with some morbid sensibility of the retina.

Causes.—It appears a patulous or an impervious state of the punctum lachrymale, preventing the secretion of the lachrymal gland passing into the sac, are the chief causes of the disease.

Females are generally subject to epiphora, which they bring on by close confinement, sewing late by candle light, and those who have passed their meridian are more affected with it. Sometimes some pain or itching attends epiphora or ophthalmia tarsi, with either a chronic inflammation of the palpebral or sclerotic conjunctiva. The disease proves more troublesome in the fall and winter, frequently disappearing in the spring and summer, and returning in the winter and fall.

It seems the increase of lachrymal fluid is brought about either by the slight chronic inflammation of the conjunctiva, or from the irritating quality of the different secretions, keeping up a constant irritation. Vision in some cases is much impaired.

Treatment.—For the cure of epiphora, detergent collyria have been recommended. Beer advises a solution of borax in peppermint water with camphorated spirit, tincture of opium or a solution of the sulphate of iron, or the nitrate of silver. The application to be dropped out of a quill several times a day into the eye. The patient lying upon his back at the time and for some minutes afterwards, in order that the operation of the remedy may not be immediately stopped. Beer furthermore recommends moderate exercise, keeping as much as possible in a dry atmosphere. Among the eye washes the nitrate of silver with a proportion of the acetite of lead and the thebiac tincture. He also states the eye lids should be rubbed with the spiritus aromaticus, or a mixture of the au de cologne and tinct opii.

The mercurial combined with citrin ointment in equal proportions, rubbed upon the palpebral margin on going to bed, will be likely to correct the morbid secretions of the Meibomian follicles.

If these means fail in producing a cure or affording any relief, the punctum should be probed with the view of over coming any obstruction that might be present in them. This can be accomplished by simply using Aniel's probe or a cambric needle slightly curved, followed by the use of any of the following collyria.

"(Hotel Dieu, St. Antoine.) Infusion of the flowers of elder oz. iv. cristallized acetate of lead gr. vi. proof spirit dr. 2.

“(St Antoine.) Rose water, common water, of each oz. 2. Alum gr. xx.

“Emollient collyrium. (Hospital des Enfans.) Root of marsh mallow dr. 2. water lb. 1. To be used in violent inflammations.

“An infusion of the peth of sassafras will answer in the same case.

“Anodyne collyrium, water, lb. i. Gummy extract of opium dr. $\frac{1}{2}$. dissolved.

“Saffron dr. i. Boiling flaxseed tea oz. iv. Liquid laudanum dr. i. To be used in cases where the eye is very sensitive.

“Astringent collyrium. (Hospital des Enfans.) Infusion of elder lb. i. Sulphate of Zinc gr. xx. This is supposed to be more suited for scrofulous ophthalmia, attended with purulent exudation.

“Another collyrium (Charite.) Watery extract of opium grs. ii. Distilled water oz. iv. Collyrium of the sulphate of Zinc. Rose water oz. iv. Sulphate of Zinc gr. xvi. (I have found this a most excellent collyrium when combined with a small portion of the tinct of capsicum and laudanum.)

“Common water oz. iv. Acetate of lead gr. x.”

Over coming obstructions in the lachrymal conduits by means of the probe, it would be requisite to inject them occasionally with tepid water, this can be done with Aniels syring, followed by weak solution of the nitrate of silver. If the practitioner thinks proper he can try to force quick silver through the punctum with the above syring. This has been recommended by some authors with the same view of over coming obstructions in the lachrymal conduits. The disease originating from a strictured condition of the nasal duct, it becomes more intractable and may terminate in a fistula of the lachrymal sac.

Antacids prove highly servicable in some cases of epiphora, when the disease does not depend upon any obstruction in the lachrymal conduits. A mixture of rhubarb and supercarbonate of sodœ may be given every other day, or every day succeeded by the administration of quinine.

Emetics.—Emetics are recommended as beneficial, an emetic has been known to remove the disease.

Lunar Caustic.—A collyrium of the nitrate of silver two or three grains to the ounce of pure water, in conjunction conveying the vapour of the black drop, or laudanum to the eye.

The aromatic collyria, such as a strong decoction of chammomile, sage, &c. By a proper use of these remedies they will prove decidedly effectual when their exists only a patulous condition of the punctum lachrymale. All astringents either of the tonic or stimulating kinds, will avail but little if used when the conduits are in an impervious condition; the disease is then remidiable only by the proper use of a suitable probe.

Encanthis.

All the different parts of the Animal body are prone to inflammation; having their peculiar terminations into scirrhous, resolution. or abscess, &c. The caruncule lachrymalis in a state of inflammation presents a reddish, tense. hard, painful tumor. The semilunar fold become affected; in fine the swelling and redness extends over the whole of sclerotic and palpebral conjunctiva the tears trickle down the cheek. The patient in closing the lids suffers considerabl from pain. As the inflammation advances, the glands of Meibomius becomes diseased with yellow grenish thin matter, filling up the inner canthus, the tarsus adhere to each other during sleep, and becomes agglutinated, considerable pain attends their seperation. The symptoms somewhat subsiding, the inflammation ends either in resolution or an abscess is formed and burst, and destroys the caruncle.

When the disease is neglected by the patient and is more protracted in its termination, it becomes scirrhous and of a spongy nature, grows to a large size, preventing partially or complete the motions of the eye lids.

The majority of writers have denominated this tumour the encanthis *maligna*. It is styled by Beer, the encanthis *fungosa*, stating that he has never seen it terminate either in cancer or to assume a malignant aspect.

Dr. Frick says: "This species of encanthis, however, which arises from idiopathic inflammation and suppuration of the gland, is to be carefully distinguished from another which is truly malignant or carcinomatous, and the purely scirrhous tumor. In the former of these, or the malignant, the excrescence is of a dark red or leaden colour, extremely hard and painful; in the second or scirrhous, the tumor is more unequal or granulated upon its surface, of a pale red color. and entirely void of pain. Where the malignant degenerates into the open form, it will be seen to shoot out a fungous growth, which bleeds from the slightest causes, and discharges a thin, acrid, and highly offensive ichor."

Treatment.—The treatment for encanthis consists in the excision of the diseased part. It can be done by passing a ligature or hook through the tumour and dissecting it out. Some considerable hemorrhage follows, which can be checked by a solution of lunar caustic applied to the excised surface with a camels hair pencil.

After the operation a soft compress of lint smeared with simple cerate should be applied, and as soon as suppuration commences the parts must be watched, if the granulation become too luxuriant they should be repressed by the argentum nitratum, applied at the discretion of the practitioner.

Dr. Frick further says, "Professor Beer, speaks highly in his lectures of the sudum acre fomentations in the malignant encanthis." He states having "seen two cases in which its employment was attended with very decided benefit. In one of these, the disease had attacked the bones, but yielded daily under the use of an infusion of this plant."

Injuries of the Lids.

For an effusion of blood in the cellular substance of the lids. I no of nothing better than the application of a piece of fresh beef for the first forty eight hours, (preceeded by the the use of a few leeches to the part,) afterwards applying allum curd poultices, or tea leaves steaped in hot water, these seldom fail in removing the ecchymosis. There are other remedies prescribed, such as bathing the lids in a solution of super acetas plumbi, zinc, muriate of ammonia, camphor, decoction of poppey, &c.

Incisions of the lids always require one or two sutures. In making sutures in the lid or lids a piece of flat ivory or silver to suit the convexity of the eye ball, should be placed between them and the ball, which will prevent injuring the eye ball by a slip of the needle.

When the lids are much lacerated or scalded, they must be treated by the occasional application of cold milk and bread poultices; it would be well before applying the emmolient to examine the inner surfaces of the lids, and syringing them with tepid water, that all foreign particles may be removed.

When the presence of any irritating matter is suspected under the lid, it can be everted in the following manner. The individual is seated upon a low stool, the practitioner then takes hold of the cilia near the tarsi or margin of the eye lid, and carefully draws it downwards and outwards from the ball. The probe or piece of thick wier is then placed parrellel to the tarsi or edge of the eye lid, immediately above this rim of cartilage, then by raising the cilia that he has in his fore finger and thumb, the lid can be turned out over the probe, and all offending matters will commonly be seen adhering to the everted surface, at this time the patient is requested to cast his eye downwards, all parts of the conjunctiva can now be easily examined. Mr. Guthrie says, he has known the country maid to raise the lid in the above manner, and introduce the end of her tongue underneath it, by which she removed foreign bodies.

After the lid is thus elevated, introducing a camel's hair pencil, and passing it gently between the lid and eye ball, afterwards injecting tepid water. By these means all particles can be extricated.

Ophthalmia Tarsi.

Inflammation of the tarsal cartilages is a disease common to all individuals. We find it however prevailing more among the votaries of Bacchus than the temperate.

Symptoms, appearances.—When an inflammatory action is about commencing in the tarsal cartilages, there is a peculiar itching with some pain and tension in one or both tarsi.—These symptoms are soon followed by redness and swelling of the edges of the eye lids, the swelling may take place in the whole of the lids. There is a tendency at this time to an invertion. The disease suffered to remain without the interference of remedies, the conjunctiva lining the lids becomes inflamed with an increase of redness in their margin. Presenting as it were a rim of scarlet encircling their edges. There is a copious secretion of lachrymal fluid. The sclerotic conjunctiva finally participates in the inflammation.

Remote or predisposing causes.—There is undoubtly a peculiar predisposition in the constitution of some individuals to attacks of ophthalmia tarsi. The disease may exist as a sympathetic affection, from functional or organic derangement of the abdominal or thoracic vicera.

Exciting causes.—The want of proper cleanliness, foreign bodies insinuated between the lids and eye ball, confined apartments, attacks of any of the oppthalmiæ, more especially of the catarrhal conjunctivitis, depraved condition of the ciliary glands or Meibomian follicles, atmospheric transitions.

Treatment.—Many nostrums are promulgated as specifies for the cure of this disease as for many other inflammatory affections of the eye, which result sometimes in little less than much malformation of the eye lids or impaired vision from opacities of the cornea, or the disease becomes so intractable from maltreatment that it often runs into a chronic state, and is succeeded by an ulcerated condition of the cartilages. This state of the lids is called *Lippitudo.*

Bloodletting, from the arm followed by a cathartic, smearing upon the lids two or three times a day the following ointment, Ung. cit. dr. 2. rub. precip gr. iii. rubbing these well together, and uniting them with half an ounce of fresh butter.

The lids should be kept constantly moist with the ointment. The inflammation and swelling having nearly subsided, the aromatic collyria should be used, or a collyrium of one grain of carosive sublimate to an ounce of rose water.

In some chronic cases it becomes necessary to give the blue pill with sarsaparella decoction.

Before using the ointment it would be well to bathe the lids occasionally in warm milk and water. Professor Beer recommends the following ointment. R. Bytyr recent, insulsi, unc, semis, vitriol cyprin, gr. x. Camphor, gr. iv. Tutiæ pptæ, gr. vj. M. exactissiment fiat Unguentum. Professor Hufeland makes use of an ointment composed of fresh butter, yellow cerate and red precipitate, equal parts of each.

Astringent washes applied in the incipient stage of the disease with the view of reducing the inflammatory action, proves highly prejudicial.

The ulcerated condition of the tarsal cartilages may be removed by occasional applications of the lunar caustic solution, or the ointment of nitrate of silver, attending particularly at the same time to the different secretions of the body.

In the debauchee the use of the blue pill and ointment recommended after blood-letting proves singularly effectual.

Ophthalmia Tarsi is apt to become in some individuals a periodical disease from neglect in cleanliness and from dissipation.

In some chronic cases an issue or seton in the nape of the neck is to be resorted to.

Fistula Lachrymalis.

When an artificial, or natural aperture is made from the external intiguments into the lachrymal sac, or vice versa, the contents of the sac flows out through the fissure over the cheek.

The term fistula has been applied by some authors to simply a swelling of the sac from the presence of matter, or the different secretions of the eye. It seems however the term is only applicable, whenever, the above opening exists, let it be accomplished by either natural or artificial means.

Symptoms and appearances.—Inflammation commencing in the mucous membrane of the sac, or nasal duct, is characterised by pain, heat and swelling of the parts. The sac becoming charged with matter, presents a small tumour situated immediately under the nasal extremity of the inferior tarsal cartilage; it will be of the size of a nutmeg at one time, and at another as large as a pigeon's egg. The incipient stage of the disease is marked by a peculiar dryness of that side of the nostril connected with the morbid lachrymal apparatus, and periodical pains shooting in the course of the nasal duct, sometimes through the head, down the cheek, and across the forehead.

These symptoms are in some subjects speedily followed by a swelling in the above named place, and in others these symptoms will continue for two or three days without any obvious tumefaction. The disease is sometimes ushered in by a severe attack of conjunctivitis, or sclerotitis, or the above membranes may take on the inflammatory action at the same time of the mucous membrane of the nasal duct or sac.

The mucous membrane of the nasal duct, or sac, in the early stage of the inflammation, becomes a secreting membrane; matter continues to collect in the sac until its coats become distended to their utmost; they with the common intiguments give way, or from the custic quality of the matter and morbid condition of the coats of the sac and intiguments, the ulcerative action commences in the interior surface of the sac, and speedily extends to the intiguments; which results in the formation of a fistulous opening, giving egress to the contents of the sac down the cheek.

The symptoms which were before violent now abate considerably. The discharge of matter will continue for months. In some individuals the escape of puss through the fissure is periodical, others a constant oozing, in those subject to a periodical discharge, there is a morbid growth of flesh which locks up the anterior opening of the fistula in the interval of the discharge.

Vision is much impaired in some subjects. The conjunctiva, all through the disease becomes deranged in function, in some cases partial ectropeon or entropeon may succeed the formation of the fistula.

The secretion from the lachrymal gland is increased, and a copious flow of the fluid is constantly poured over the eye ball and down the cheek. The Meibomian follicles take on a morbid secretion.

The sence of smelling is likewise impaired. The tarsal cartilages become excoriated or an ulcerative action will take place, producing a very distressing train of symptoms. In fistula lachrymalis the lachrymal conduits are either obliterated or pervious from the commencement of the inflammatory action but we commonly find these conduits pervious, consequently when the sac is filled with puss and pressure be made upon it, matter will escape through the punctum lachrymale into the eye.

When this disease attacks the lower order of individuals, and from want of proper cleanliness, a greater extent of morbid action may supervene upon the formation of the fistula, an expoliation of the boney parieties and in some cases exostosis.

The disease taking place in a scrofulous constitution, will be found not unfrequently connected with strumous ophthalmia. The inflammatory symptoms in this scrofulous subject is not so severe, the pains not lancinating, but dull and rather obtuse, and the morbid changes are slow in taking place, compared to those which take place in subjects not scrofulous. However the practitioner can pretty commonly tell whether the inflammation in the sac or duct be of the scrofulous kind or not from the appearances of the patients constitution, for a scrofulous constitution can be seen in the general aspect of some subjects, by the most superficial observer.

Remote or predisposing causes.—The remote or predisposing causes of this disease, may originate from a strumous scorbutic, or syphilitic habit, frequent attacks of any of the ophthalmiæ, injuries inflicted on the sac, &c.

Exciting causes.—Inflammation of the mucous tissue of the nasal duct may give rise to the disease, by the formation of a stricture in some part of it—a blow inflicted over the course of the duct, so as to produce a depression of the boney parieties. Any morbid condition of the nasal duct or sac may result in a strictured condition of some portion of the duct.

Diagnosis.—A collection of pus in the sac (which state of this sac is called mucocele) authors say is distinguished from a dropsy of it by the fealing and appearances.

When the sac is charged with serum only, the tumour has a transparent appearance, with a doughey touch not unlike ascitis. In some subjects, however, the tumour is quite elastic, and occasionally if the nasal duct be not completely obliterated by the stricture an oozing of the contents of the sac takes place into the nose. "The sac is also subject to dropsy, in which state it acquires the size of a pigeon's egg, projecting the lower lid next the nose; the tumour is perfectly transparent, containing a fluid like that of hydrocele. Its natural openings are closed, for it does not admit of evacuation by pressure; it is very considerably extended within the orbit on the nasal side. This has been termed the hydated tumour of the lachrymal sac." In mucocele (or a collection of matter in the sac,) the integuments surrounding the sac is much swollen; so much so, as to destroy the appearance of the orbitar fossa. The punctum lachrymale being commonly pervious in mucocele the puriform matter can (by using pressure on the distended sac) be made to escape through them into the eye, the tumour is not transparent, the intiguments are inflamed. The whole has a felling of hardness.

Prognosis.—I presume it is rather difficult to prognosticate the termination of puss or serum in the lachrymal sac. However when a discharge of matter takes place through the nasal duct, and the swelling abates, may be considered as favourable signs, but when the nasal duct is so strictured as to prevent the escape of matter, a fistulous opening of the sac is inevitably the consequence.

Treatment.—There seems to be but little deviation at the present period from Mr. Ware's method of treating fistula lachrymalis. The reader will obtain a very injurious investigation of the disease by examining his work. However, when we are called to attend a case, for inflammation of the mucous membrane of the nasal duct or sac, our chief object would to arrest by a rigid antiphlogistic treatment, the infantile inflammatory stage, with the intention of preventing, if possible, the formation of a stricture in the nasal duct. When we can accomplish this, if the inflammed membrane takes on the secretion of puriform matter no abscess will form in consequence of their being no obsticle to its escape through the nasal duct.—Bloodletting from the arm with mercurial carthartics are to be depended upon in athletics subjects. After the arterial system has been reduced by the above depletory means, the application of an epispastic over the situation of the sac and nasal duct would be likely to cut short the inflammatory action. At the time the blistering plaster is applied emetic tartar should be administered in suitable doses to keep up a constant nausea.

In individuals of broken down constitutions or where there is a weak stamina, the application of leeches to the parts are recommended, but I doubt their superiority over venesection at the bend of the arm.

When the first epispastic seems to have somewhat alleviated the symptoms, a second one should be immediately applied over the same place, and the emetic tartar persisted in.

Perhaps much good would accrue by forcing through the sac and nasal duct, quick silver after the inflammatory symptoms abate, this could be done by means of Anul's syringe or a small silver tube, the extremity can be introduced into the lower punctum: to follow the depletory means. The attempts at opening the nasal canal should not be long delayed, for by a timely interference of the quick silver a passage through the duct could be made or any tendency to the formation of a stricture broken up. Indeed I conceive this a most excellent practice. The quick silver should be forced through the duct if possible two or three times a day until the practitioner perceives a decided cessation of the symptoms.

But it may happen from the quick morbid changes, the nasal duct becomes strictured and the sac charged with puss and much distended. In this state of the disease a timely opening of the sac by means of an incision made horizontally into it, giving egress to its contents should be done, and the nasal duct probed by a suitable probe with the view of breaking up the stricture, and the nasal duct kept pervious by the use of the probe A weak solution of lunar caustic should be thrown into the sac down the duct. The suppurative action in the mucous membrane seeming to abate, and the incision in the sac and intiguments look healthy and throws out granulations, the orifice should be permitted to heal, but where the suppurative action is not likely to cease in the sac, the introducing in the duct wares style seems to be the only resourse of treatment.

The Author hopes the reader will look over the imperfections of this work. The manner in which it was undertaken and completed by a part of the printers is of too delicate a nature to allow of an explanation here. It was not "the laws delay," but the printers procrastination combined with non-attention and mismanagement. However I believe but few individuals are acquainted with an authors position while engaged in accomplishing a work of this magnitude. Tossed dangerously as the mariner is by the tempest over the bosom of the convulsed ocean, so many an author has had his bark alike beset by unprosperous and repulsive gales.

It is not every Authors path that is strewed with flowers; or that he gambols in the sunshine of affluence with dame fortune tendering him and throwing aside the many insurmountable barriers which he meets with in his course—no you can espie him at one time ascending a precipiece abounding in obsticles of the most insurpassable, or discover him seated upon a barron rock plucking from an anxious care worn mind the smothered thought or spurring it to an excitement. And nothing short of bouyant feelings together with the most indefatigable exertions, will suffice for accomplishing the thing he has in view.

The plates were done from my own drawings, some of the eyes are coloured from description—others from diseases which have come under my own observation. But the reader can perceive those coloured from description are correctly done as possible.

The coloured plates may not represent a *fac simile* of the morbid tissue or tissues; nevertheless the similtude is so striking, that they will afford an easier manner of ascertaining the true character and peculiar features of each particular disease, especially those of the different ophthalmiæ.

PLATE 1.

Fig. 1. The orbit is here drawn in an oblique position, which places the nasal duct in rather an oblique situation. In the living subject the duct stands nearly in a perpendicular line.
1.1.1 Branches of the seventh pair of nerves 2. Foramen lacerum orbitale superius.
3. Ophthalmic vien. 4. Nasal tube. 5. Lachrymal gland. 6. Superciliary notch.
7. Optic foramen, for the passage of the optic nerve and ophthalmic artery. 8. Os. ungis. I conceived it unnecessary to point out the other bones.
Fig 2. 11. Orbicularis palpebrarum.
2. Internal canthus.
3. 3. Temporal side of the tarsal cartilages. The angle formed by their union called the external canthus.
Fig. 3. Represents the broad fan like tendon of the levator palpebrarum and its union with the tarsal cartilage, together with the proper course of the blood vessels.
1. Tendon of the levator palpebrarum. 2. Conjunctiva.
3. Tarsal cartilage.
Fig. 4. A representation of the beautiful broad tendons of the four straight or rectus muscles.
1.1.1.2. The foramina in the sclerotica for the entrance, and exit of the different ciliary vessels and nerves.
3.4.7. Rectus muscles; immediately behind the muscle marked 7, lies the fourth one.
5. Inferior oblique.
8. Superior oblique.
9 Optic nerve with the ophthalmic artery passing around it.
10. The ligamentous pully through which plays the tendon of the obliquous superior muscle.
11. Tendon of the superior oblique.
Fig. 5. A transverse section of the sclerotic coat, shewing the course of the long ciliary arteries, their distribution on the posterior surface of the iris (called uvea) and the ciliary ring.
Fig. 6. Anterior view of the eye ball outer surface of the choroid. The sclerotic coat, cornea, and iris have been removed.
1. Chrystalline lens.
2. Corona ciliaris a whitsh circle surrounding a portion of the ciliary processes.
3. Ciliary ligament.
4. Ciliary processes.
Fig. 7. Representation of half of the anterior portion of the choroid, representing the vena vorticosæ. 1. Cornea. 2. Lens. 3 Ciliary processes. 4. Ciliary ligament, and its situation to the circumference of the cornea. 5. Choroid coat. 6. Sclerotic coat.
Fig. 8. Transverse section.
1. Porus opticus.
10.10. The porous state of the sclerotic coat, called cribreform plate, through which is supposed passes the fibres of the optic nerve. The retina has been removed from this part. 9. 2. The monticulus. 3. Foramen of Sœmmering 4. The yellowish spot the seat of luminous impressions and the central artery and vein forming a delicate corona around it. 5. Sclerotic coat. 6. Choroid. 7. Retina. 8. Tunica Hyaloidea.

The middle instrument is "Dr. Reisinger's, double-hooked forceps for the performance of korodialysis" *c* a single limb side view. 3. "Beer's lance pointed needle, for the displacement of the lens." 1. Beer's cataract knife.

PLATE 2.

Fig. 1. Posterior view of the choroid, with the vena voticosæ, a portion of the sclerotica removed.
- 1. Optic nerve.
- 2. Edge of the sclerotic coat.
- 3. The convoluted trunks of the choroid.

Fig. 2. Interior surface of the anterior portion of the sclerotic coat. The ciliary processes and lens.
- 1. Lens.
- 2. Ciliary processes.

Fig. 3. Vertical section, shewing the cells of the vitreous humour, encompassed by the tunica hyaloidea. The two lines projecting from the circumference is the continuation of the tunica Jacobi. 1. Cornea. 2. Iris.
- 3. Chrystalline lens. The angular points on the upper and lower surfaces of the lens, represents the situation of the canal of Petit.
- 4. Ciliary processes.
- 5. Central artery.
- 6 Optic nerve.
- 7.7. The cells of the vitreous hemour.

Fig. 4. "A plan of the muscular branes of the ophthalmic artery, from Sœmmering."
- 2.2.2.2. Muscular fibres and blood vessels of the rectus muscles.
- 11. Conjunctiva dissected up.
- 3. Sclerotic coat.
- 4. Cornea.
- 5 Pupil.

Fig. 5. 1.1.1.1 1. Meibomian follicles.
- 2. Carnucula lachrymalis.
- 3. Semilunar fold.
- 4.4. Punctam lachrymale.
- 5.5.5. Commissure of the conjunctiva.
- 6.6.6. Superior and inferior tarsal cartilages.
- 7.7.7.7. Ciliary glands.
- 8. Lesser circle or pupillary edge of the iris.
- 11. Larger circle. or ciliary edge of the iris.

Fig. 6. 1. Lachrymal sac.
- 2. Nasal duct.
- 3.3. Lachrymal conduits.
- 4.4. Punctum lachrymale.
- 5.5.5. Excretory ducts of the lachrymal gland.
- 7. The straight and circular fibres of the iris.
- 8.8. Tarsal cartilages.

Fig. 7. Internal surface of the anterior portion of the sclerotic coat. The ciliary ligament is here represented broad to shew the distribution of the long and short ciliary nerves. forming a plexes. called by Sœmmering the annulus gangleformis.

Fig. 8. The internal membrane of the choroid, denominated tunica Ruyschiana, black pigment on its inner surface, and retina dissected from a portion of it shewing its division into the three layers. 1. Tunica Jacobi. 2. The nervous matter. 3. Tunica vasculosa retinæ. 4. Pigmentum nigrum with the minute villi. 5. Inner surface of the Tunica vasculosa retinæ. 6. Tunica Ruyschiana.

PLATE 3.

Fig. 1. Anterior capsular cataract.
Fig. 7. Cataracta morgagniana.
Fig. 11. Cataracta capsula-lenticularis marmoracea.
Fig. 12.————Senesta.
Fig. 13.————Striata.
Fig. 14.————Centralis.
Fig. 8.————Punctata.
Fig. 2.————Dimidiata.
Fig. 5. Cataract, having a pseudo membrane on its anterior surface.
Fig. 3. Cataracta capsulo-lenticularis cystica.
Fig 10 Cataracta capsulo-lenticularis siliquata.
Fig. 4. Cataracta capsulo-lenticularis, cum bursa ichore continente.
Fig. 9. Soft or cheesy cataract. This species of cataract is often met with.
Fig. 15. A peculiar ragged, angular condition of the iris in some cataracts.
Fig. 6. A healthy eye.

PLATE 4

Fig. 1 The operation of keratonyxis through the cornea with Langenbeck's knife.
Fig. 2. Mr. Saunders' operation and needle, lid elevated by pellier's speculum.
Fig. 3. The operation of Sir William Adams. For the division and laceration of the lens, and the removal of the pieces into the anterior chamber of the aqueous humour.
Fig. 4. Coutching or depressing the lens below the axis of vision, with Scarpa's needle.
Fig. 5. The operator of extraction.
Fig. 6. The operation of extraction with Wenzel's knife.
Fig. 7. Extracting with Beer's knife, the situation of the fingers.
Fig. 8. The same operation. knife passed through the cornea. The dotted line marks as much of the cornea as is incised.

PLATE 5.

Fig. 2. "An Artificial Pupil of a large sixe, formed with the knife (coretomia.) in which the capsule and shrunk lens remain attached to the lower edge of the newly formed pupil.

Fig. 3. "The appearance of an Artificial Pupil formed in the eye of a man (say Mr. Guthrie) at the Infirmary, who had been twenty-four years blind of both eyes. He saw extremely well.

Fig. 4. "Taken from Scarpa to show an Artificial Pupil formed by the scissars; the opening in the cornea being marked by a line, the segment of a circle.

Fig. 5. "The appearance of a good sized pupil made by excision of a portion of the iris.

Fig. 6. "A separation of the iris from the ciliary ligament, the consequence of a blow.

Fig. 7. "This separation imitated by art. The letters *a* and *b* being intended to give an idea to the student of the place where the opening is to be made in the cornea."

Fig. 8. An Artificial Pupil with two thirds opaque cornea.

Fig. 9. This figure shews the way by which the probe or style can be carried down the nasal duct. The instrument is first entered at the line 2, and before pressing it onwards, it is raised in the line 1, and pressed downwards.

4. Instrument.
5. Commencement of the nasal duct.
8. Its termination.

Fig. 10. Making a transverse section of the iris for artificial pupil. The dotted line marks the extent of the incision.

Fig. 1 The operation for Artificial Pupil as was performed by Gibson, of Manchester, England.

Instrument 6. Graefe's coreoncion or doble hooked forceps.
a. The movable ring which clares the hooks.
b.b. The two hooks.
c.c. The two shafts or limbs of the hooks.

PLATE 6.

Fig. 1. Represents the pink or rose coulored radiating vessels of the sclerotica, contracted pupiland discoloured iris as is seen in rheumatic ophthalmia.

Fig. 2. Catarrho-rheumatic ophthalmia. The zonular sclerotitis with conjunctivitis.

Fig. 3. Scrofulous corneitis, sclerotic redness of a carmine colour inclining to purpleish, reddish ring round the cornea, with a peculiar vascular condition of the cornea, called *pannus.*

Fig. 4. Ulcer of the cornea, red vessels running into it, and ophthalmia tarsi.

Fig. 5. Scrofulous ophthalmia, incipient appearances, redness chiefly in the palpebral conjunctiva. A few vessels are seen traversing the conjunctiva running in fasiculus and terminating in the phlyctenulæ.

Fig. 6. A more aggravated forme of scrofulous ophthalmia with pustules.

Fig. 7. Erysipelatous ophthalmia; pale redness of the conjunctiva, with pustules surrounding the cornea.

Fig. 8. Variolus ophthalmia.

Instrument 11. Daviels curette the round curved needle at the upper extremity of the handle “is commonly employed for dividing the capsule in the extraction of thelens“ 10. Wenzel's cataract knife. 8. Scarpa's couching needle. 7. Saunders' needle for cataract. 9. “Langenbeck's knife for the breaking up of a soft lens through the conea. 5. Curved needle used in reclination through the cornea“.

See the symtoms of the above ophthalmiæ.

PLATE 7 PART 1st

Fig. 1. Syphilitic iritis, zonular sclerotitis or the radiating vessels of the sclerotica; change of the pupillary edge of the iris, condylomata of Beer with displacement of the pupil.

Fig. 2. Syphilitic iritis, with cysts contaning yellow fluid, slight conjunctivitis.

Fig. 3. Arthritic iritis. The dirty grey, violet appearance of the sclerotica, conjunctival redness of a purplish hue, with the bluish ring encircling the cornea. The iris has changed from its natural, to a green colour, contracted pupil.

Fig. 4. Choroiditis. Light or deep blue appearance of the sclerotica with a protrusion of that coat and disfiguration of the iris.

Fig. 5. Chemosis, succeeding an attack of conjunctivitis.

Fig. 6. Iritis, with dilated pupil. Zonular redness, discolouration of the iris.

Fig. 7. Iritis, contraction of the pupil, vessels vissible on the iris, zonular redness, discolouration of the iris.

Fig. 8. Iritis, in a higher degree with conjunctivitis, redish iris. Zonular redness.

Instrument 20. The curved bladed instrument used in exterpating the eye ball.

15. Mr Saunder's larger sized needle for cataract. *b* the edge of the instrument.

16. "Is a representation of Schmidt's curved lancet shaped needle, for the performance of koretodyalisis. The point and edges of the instrument should be rendered as sharp as possible." The point *b* should be slightly curved, an oversite of the artist. *See the symptoms of the above ophthalmiæ.*

PLATE 8 PART 2d

Fig. 10. The operation or removing the eyeball.
Fig. 11. Ectropeon. and the operation.
Fig. 12. The lids kept together after the operation with sutures and adhesive strips.
Fig. 13. The appearance of an eye after Mr. Saunder's operation for entropeon.
Fig. 14. Both cartilages are removed. for entropeon.
Fig. 15. The black lines mark the places for the incisions in removing the cartsegali for entropeon.

PLATE 7, *Part. 2d.*

Fig. 9. A peculiar disease of the conjunctiva, called *pannus*.
Fig. 10. Ulcer of the cornea.
Fig. 11. Ulcer of the cornea, vessels running into it.
Fig. 12. Complete opacity of the cornea.
Fig. 14 Procidentia cornea.
Fig. 15. Cornea half opaque.
Fig. 13. That opacity of the cornea denominated albugo or cicatrix.

Instrument 12, "A fine eye forceps constructed with a small hook, or tooth *a* at one extremity, which fits when closed into a corresponding cavity in the other, serving in this same manner to prevent the branches from gliding over each other, and to retain more firmly whatever is grasped. This instrument is employed for the extraction of foreign bodies lodged in the conjunctiva, in the exterpation of pterygium or for the removal of the opaque capsule after the extraction of the lens."

21. Mandrin and Canule, used in operating upon the nasal duct.
22. Ware's style.

PLATE 8. *Part 1st.*

Fig. 1. Hypopion with vehement conjunctivitis.
Fig. 2. Pterygium.
Fig. 3. The operation for pterygium, Scarpa's method.
Fig. 4. Encanthis.
Fig. 5. Prolapsus Iridis.
Fig. 6. Staphyloma. This disease is supposed to originate from a redundant secretion of the aqueous humour. I am disposed to believe their is no increase of the aqueous secretion: that it arises from some functional or organic derangement of the absorbents; consequently the secerning vessels become increased in ratio to the absorbent process.
Fig. 7. Fungous Hæmatodes this disease appears to have its seat in the medullary portion of the retina. it consists in the sprouting of a tumor from the bottom of the eye ball, destroys in its growth all parts of the eye, it may finally grow to such an extent as to perforate the cornea. The disease invariable proves destructive to the eve, if not to the patient. And early exterpation of the eye ball has been resorted, with but little success
Fig 8. Carcinoma of the eye ball. this disease has its seat primaly in the conjunctiva. exterpation of the eye ball appears to be the only resource of treatment.
Fig. 9. This figure was intended to represent the incipient stage of cancer, by the redish tumour with vessels running into it. Together with the appearance of an onyx.

PTALE 9.

Fig. 1. Mr. Guthries operation for inversion.

5. The inner incision close to the punctum lachrymale.

4. The ligatures supporting the lid against the brow, and more particular the inner one, which is passed through the edge of the lid.

1. The outer incision close to the external canthus.

2. The line of incision in a case of inversion of the lower lid.

The three strips are the strips of adhesive plaster affixing the legatures of the forehead, and which must be numerous as will answer the purpose."

Fig. 2. Entropeon with Mr. Guthries operation on both lids.

Fig. 3. The division of the lid for entropeon as was suggested.

Fig. 4. An accident which occasionally occurs in the operation for extraction the iris is incised in consequence of its falling before the knife.

Fig. 5. Another accident. The straight needle has been thrust through the iris.

Fig. 6. Opening the cornea. removing an extraneous body, the artist in this figure has made a mistake the body marked-2. should have been in the anterior chamber

Fig. 7. Removing a spiculum of iron from the cornea.

1 the spiculum.

PLATE 10.

Fig. 13. "Barthisch's forceps for extirpating the fold of skin in the operation of trichiasis; the plates b. .c should be slightly, curved and hollowed out on the sides, so as to grasp more firmly the sold of integuments."

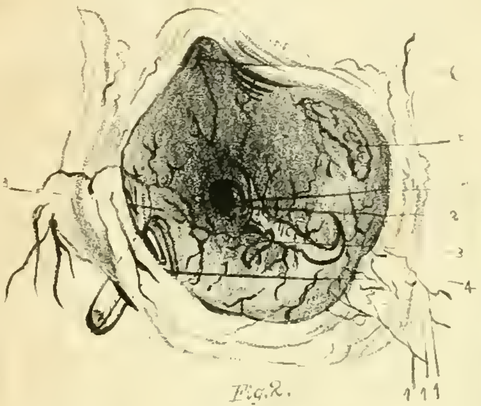
Fig 14. "The double curved scissors of Daviel. This instrument is resorted to for enlarging the incision of the cornea, in the extraction of cataract."

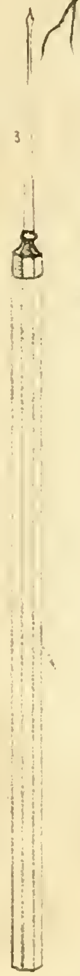
25. Wenzel's forceps.
24. Hey's couching needle
17. An instrument like Scarpa's needle for cataract,
13. A curved needle for capsular cataract.
29. Pelliers speculum.
18. Mr. Saunders small needle for cataract,an in strument extremely applicable to the division and laceration of the lens.
26. Dr. Physic's forceps for artificial pupil. "Dr. Physic has for many years been in the habit of making a section of the cornea, as for the extraction of cataract, and afterwards of removing a portion of the iris by means of a pair of forceps terminating in narrow extremiti es of which is fixed a sharp circular punch. The iris in cases where the pupil is obliterated, must be punctured by the point of the knife in making the section of the cornea, and then the forceps can readily sieze it."
28. A delicate pair of scissors for artificial pupil.
27. Forceps used in operations for artificial pupil.

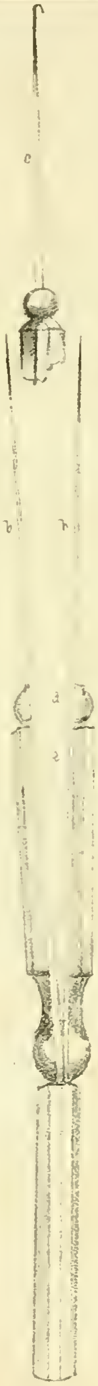
The instruments here represented are rather larger than what they are. They can be obtained of their proper sizes at any of our surgical instrument manufacturers.

PL. 1.

Fig 1.







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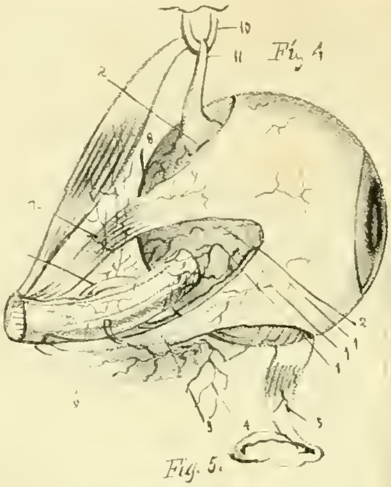

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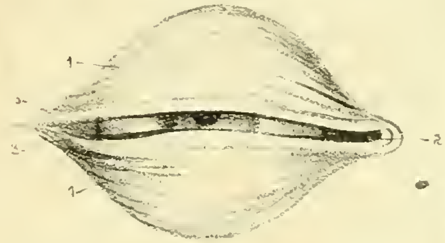

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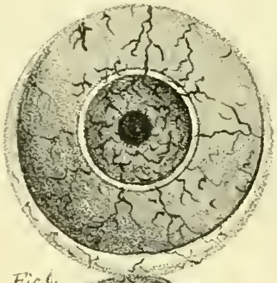

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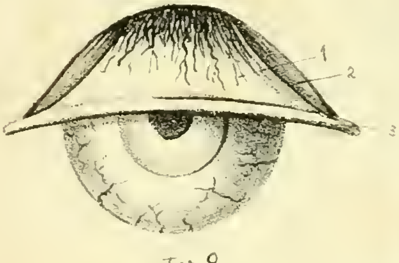

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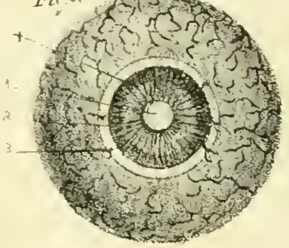

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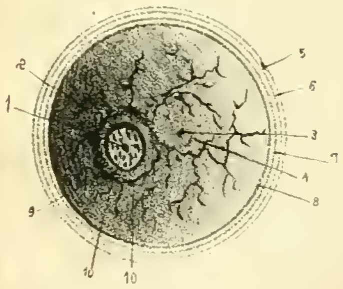

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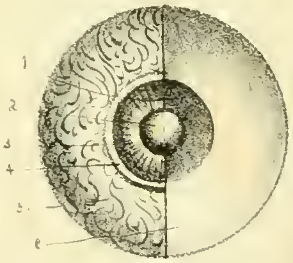

Lithog. of Endicott & Swett. N.Y.

PL.2.

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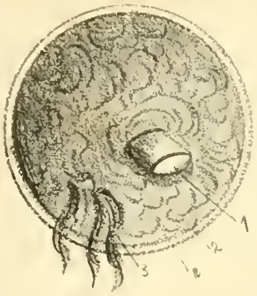

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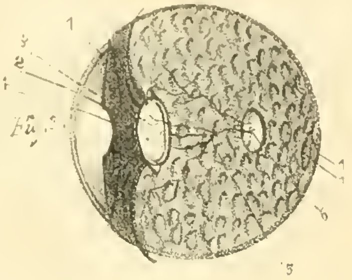

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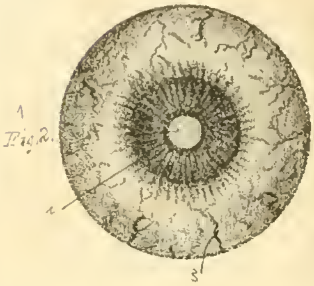

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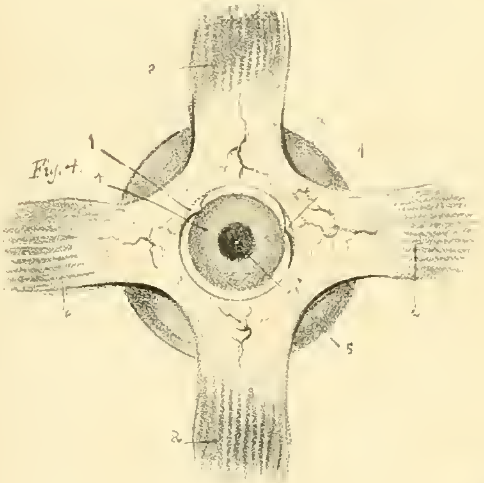

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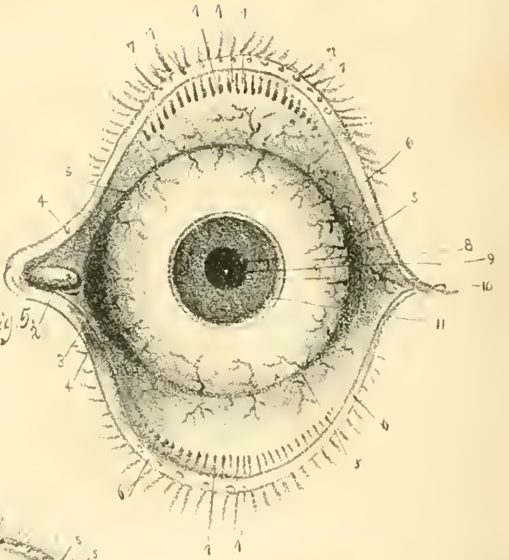

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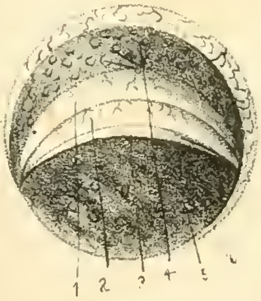

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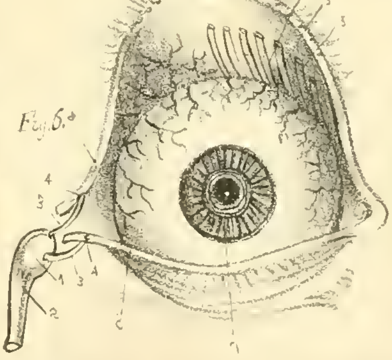

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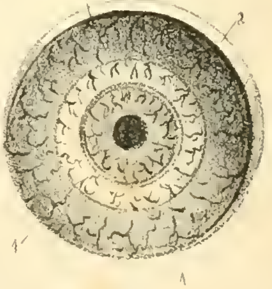

Lithog of Endicott & Swett, N.Y.

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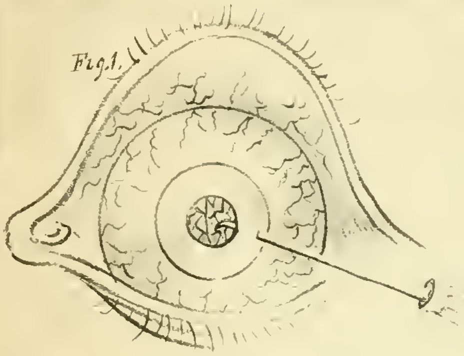

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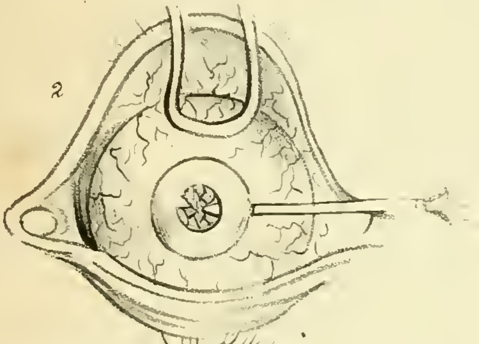

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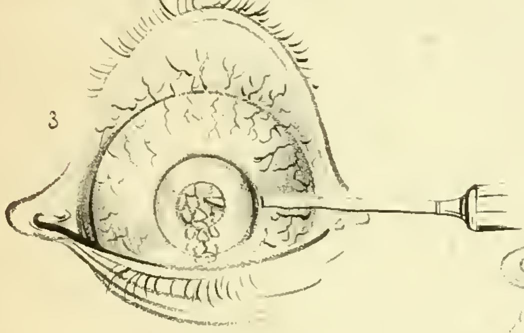

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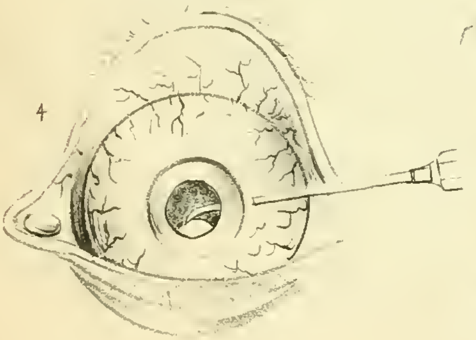

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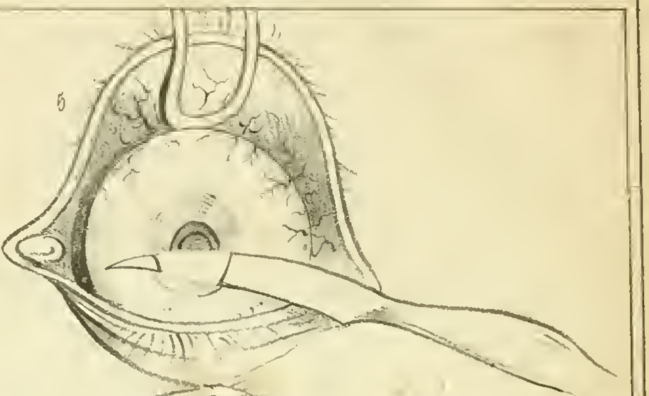

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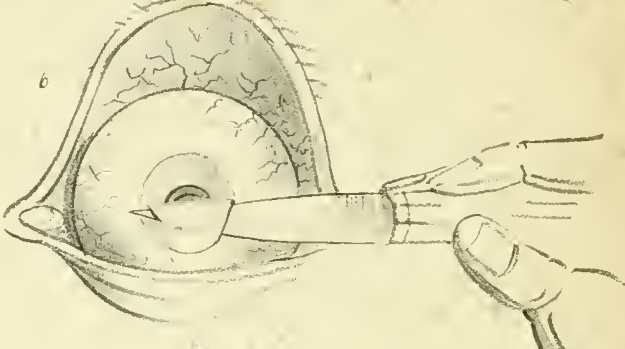

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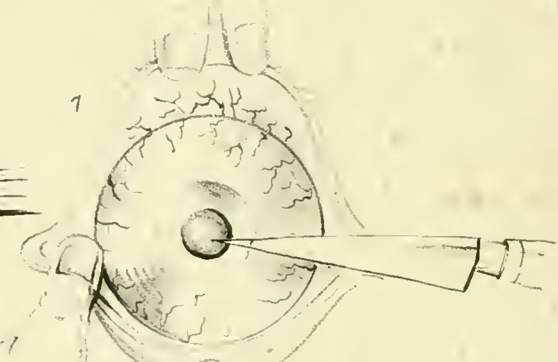

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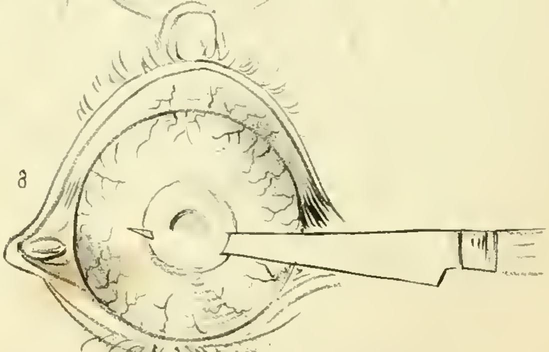

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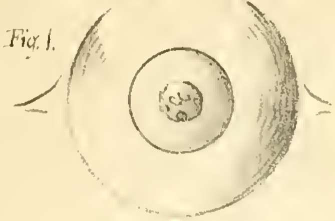

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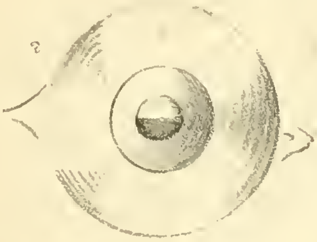

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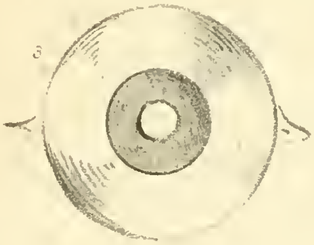

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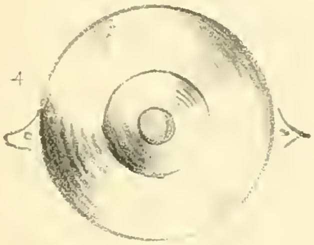

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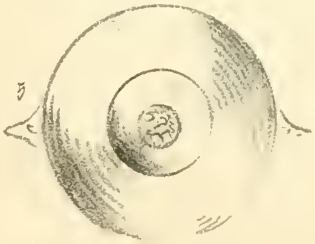

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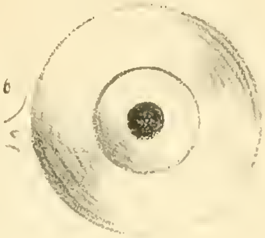

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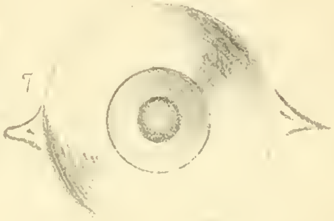

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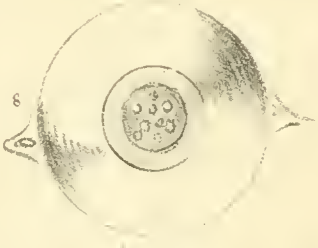

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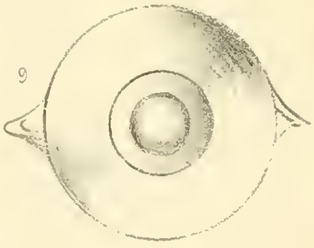

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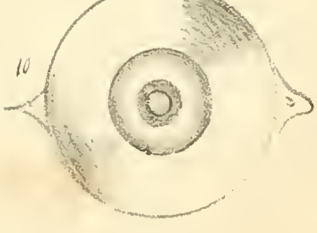

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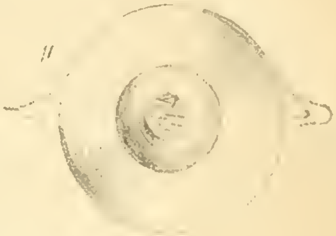

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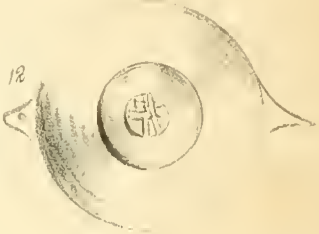

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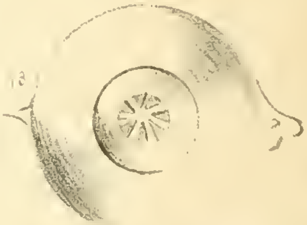

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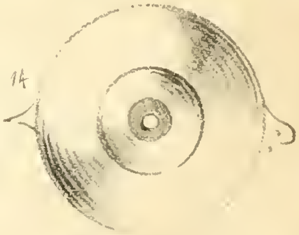

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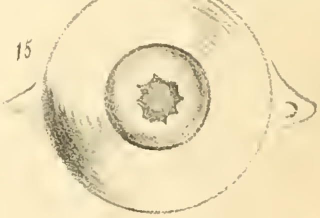

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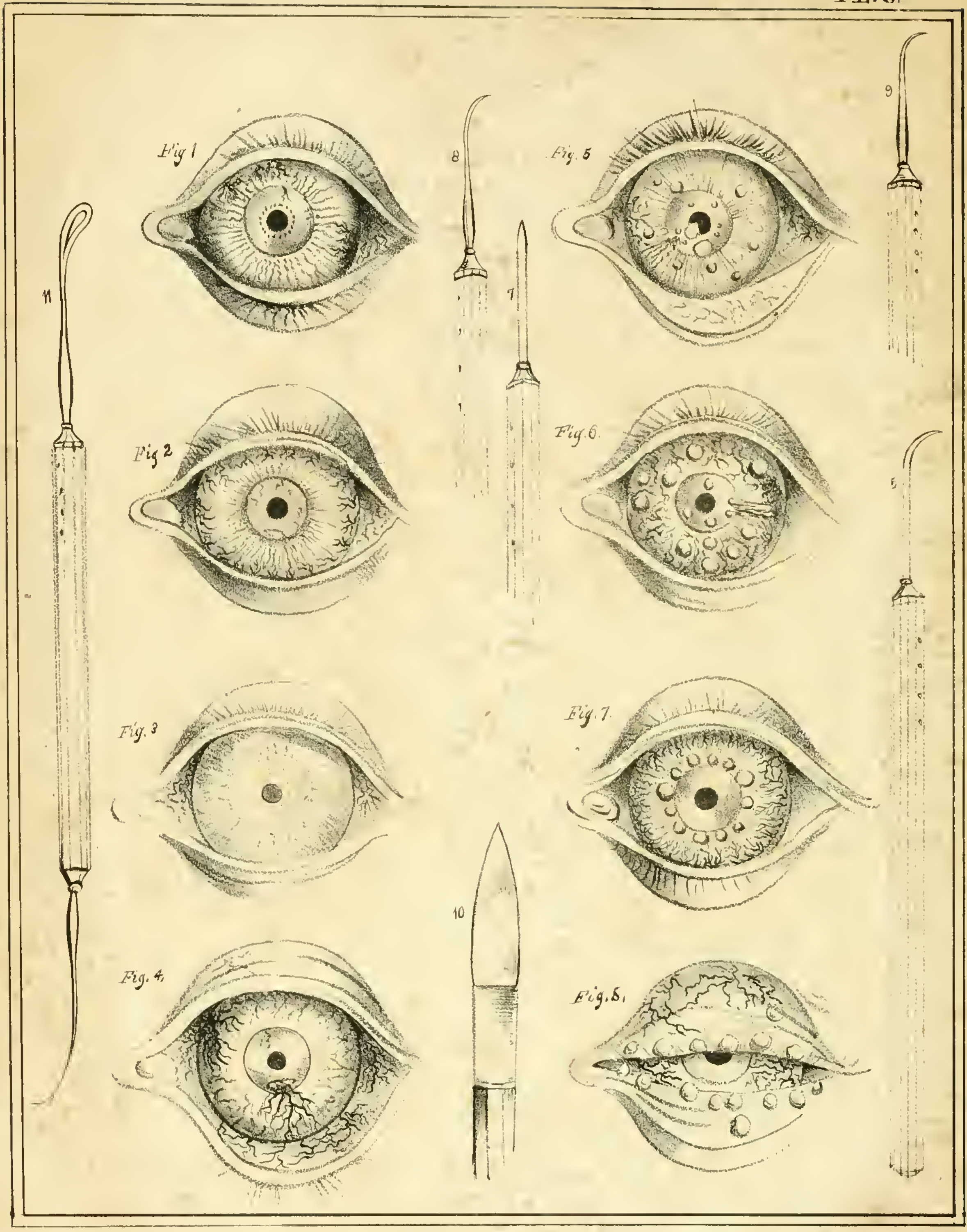

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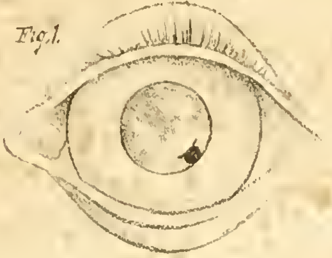

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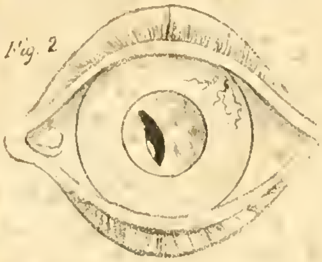

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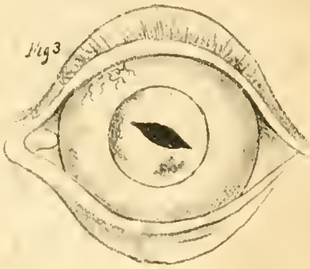

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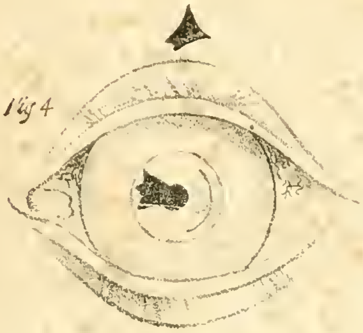

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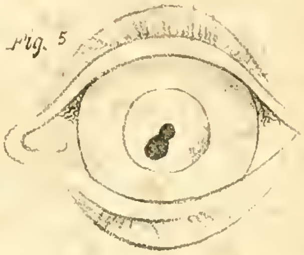

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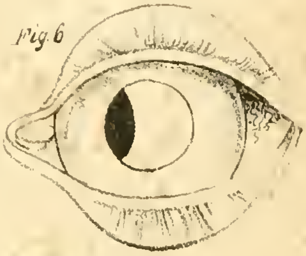

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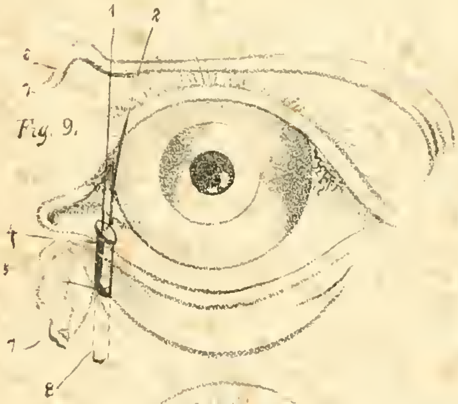

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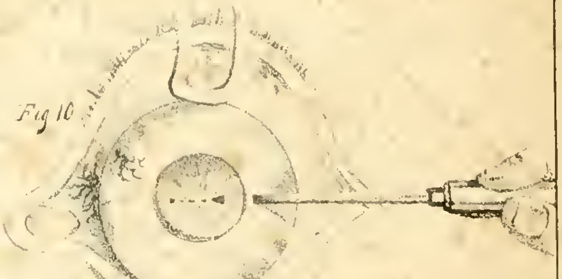

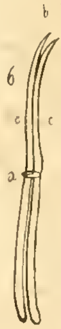

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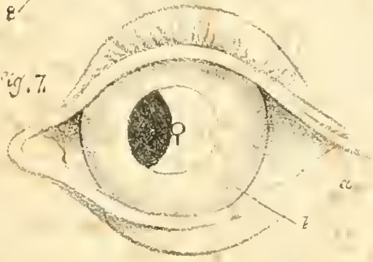

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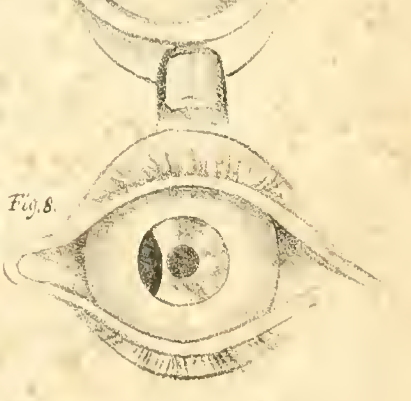

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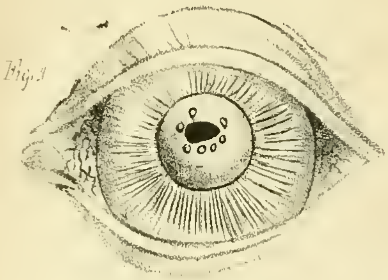

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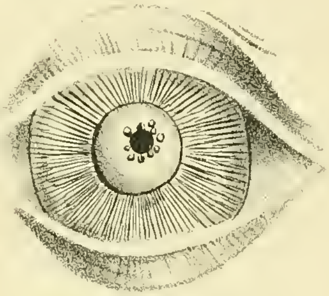

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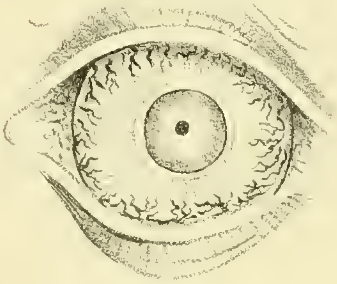

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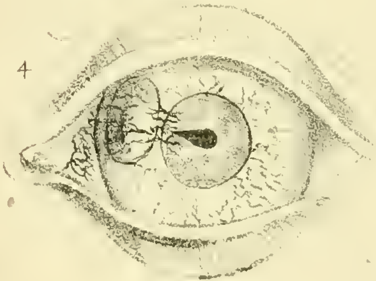

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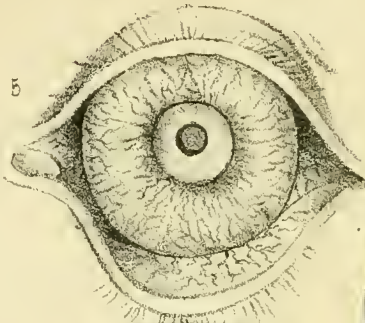

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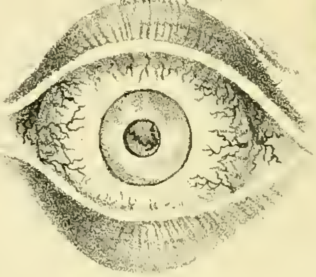

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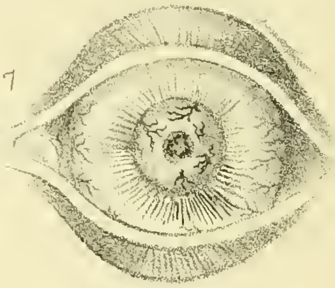

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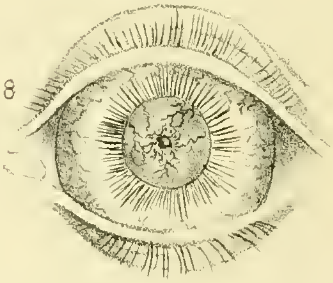

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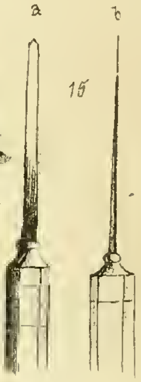

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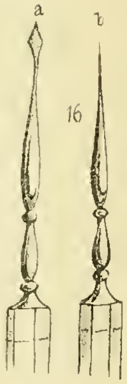

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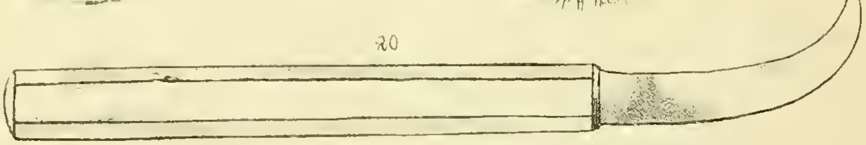
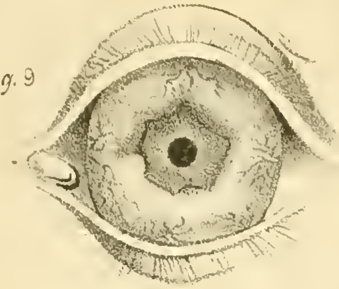


Fig. 9



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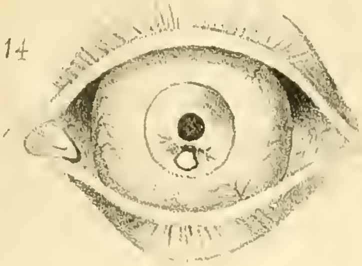

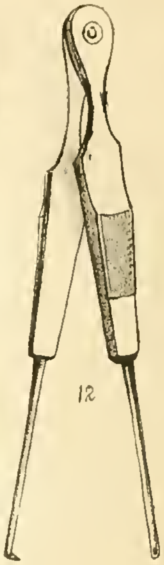

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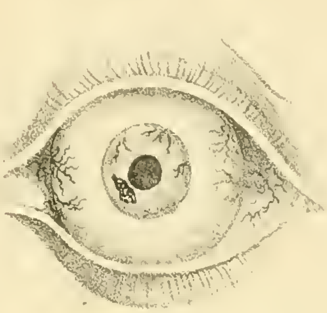

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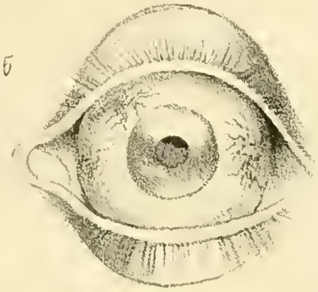

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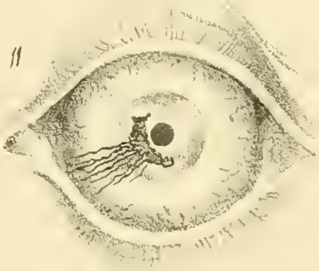

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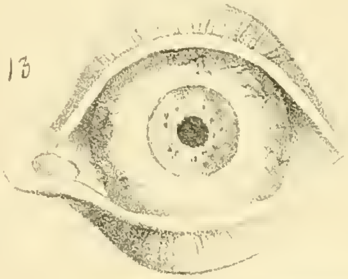

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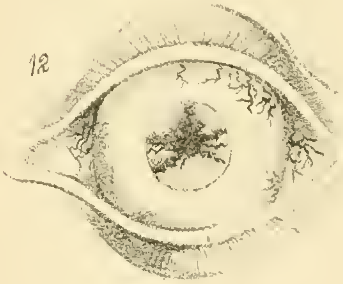

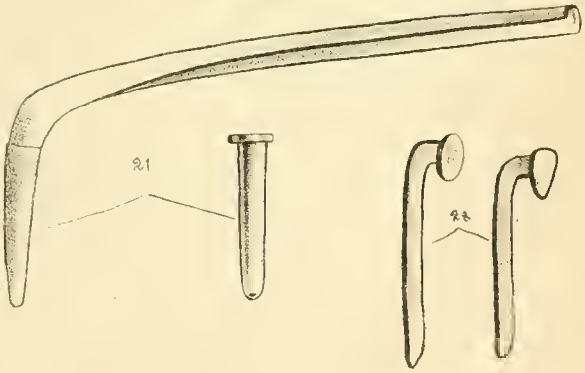

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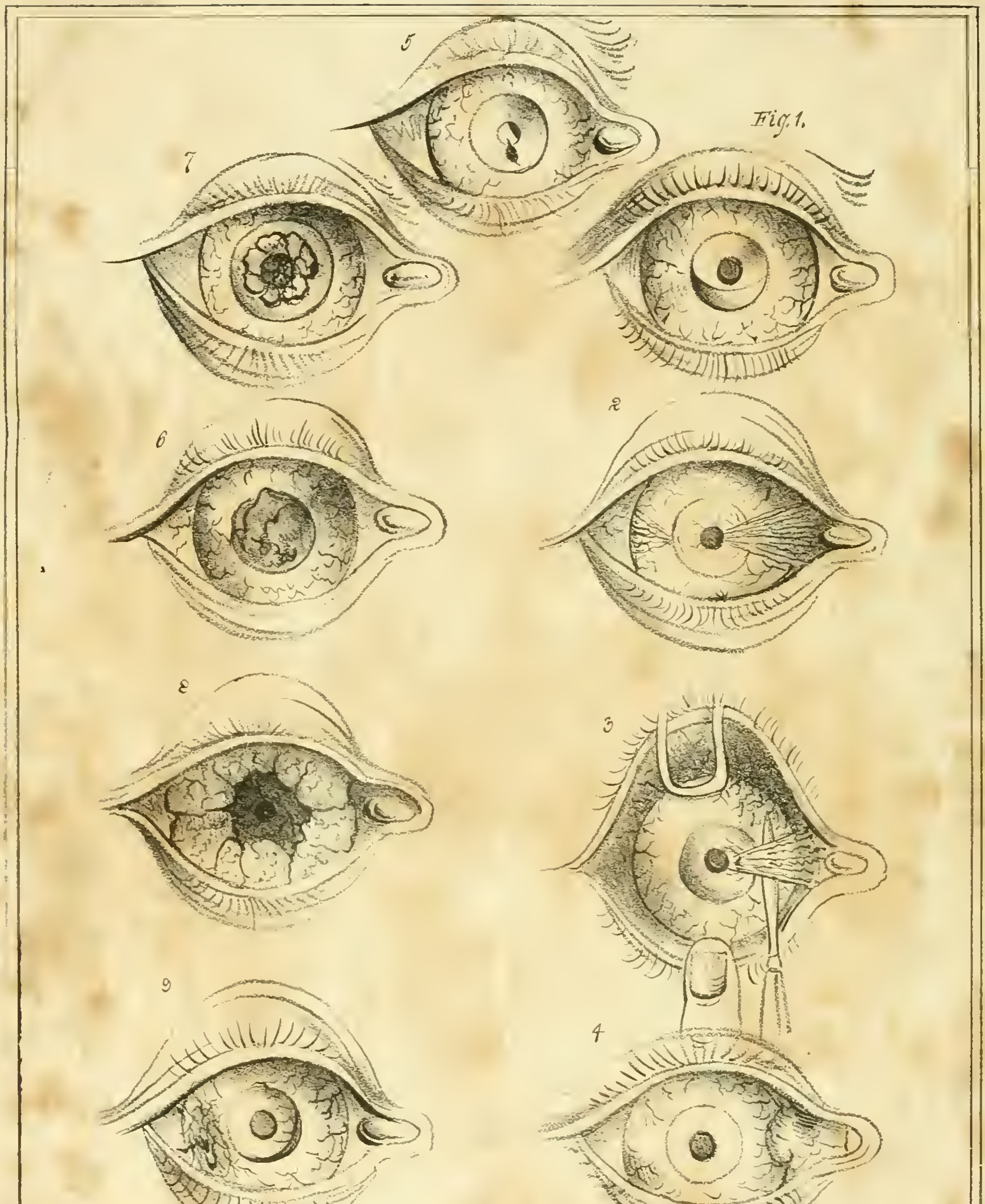
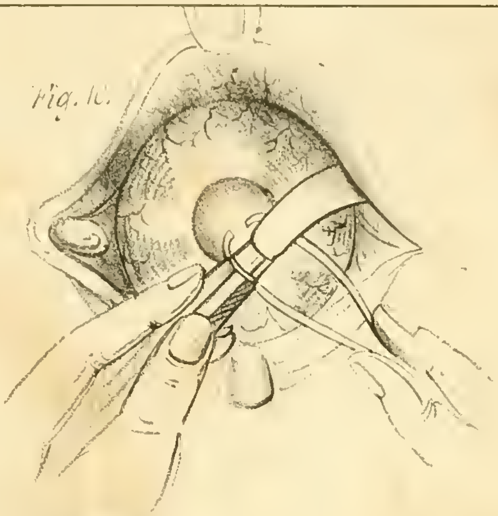
PL. 8. Part 1st.



PL. 8. Part 2^{d}.

Fig. 10.



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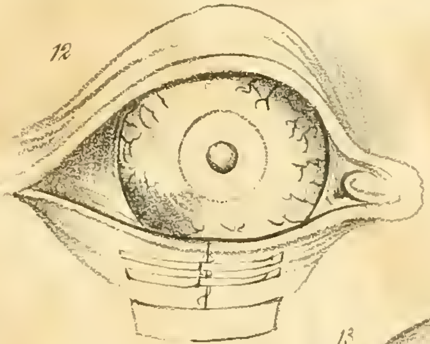

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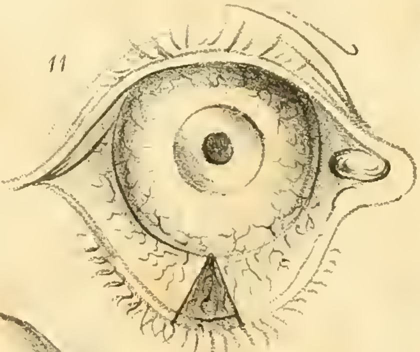

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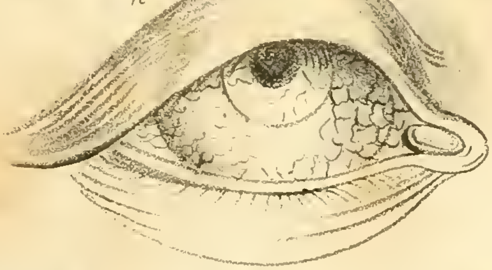

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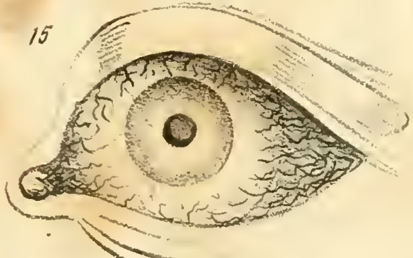

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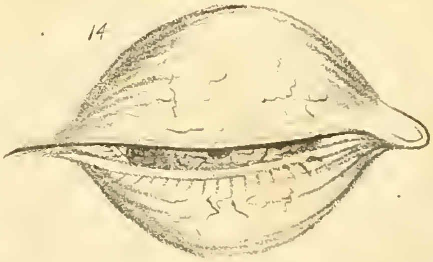
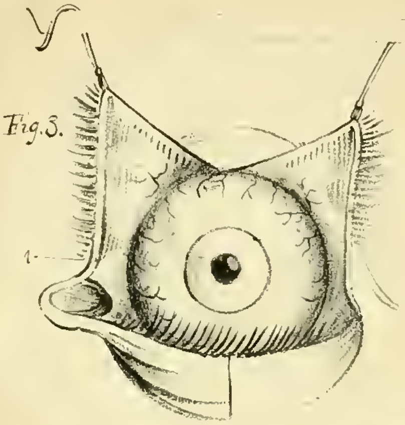


PL. 9.

Fig. 3.



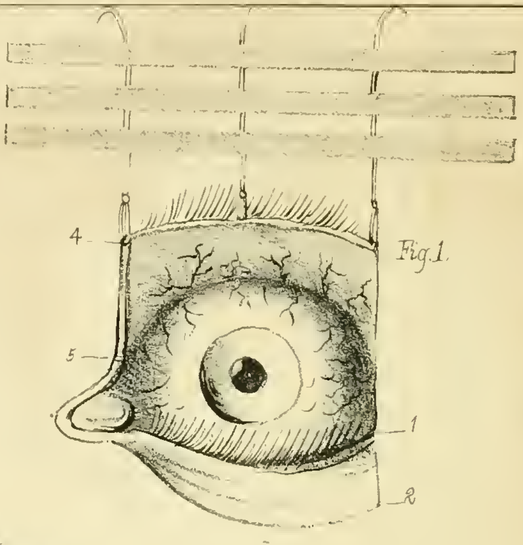
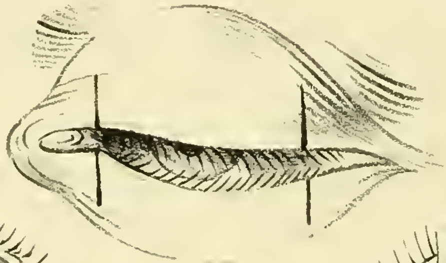


Fig. 1.

2



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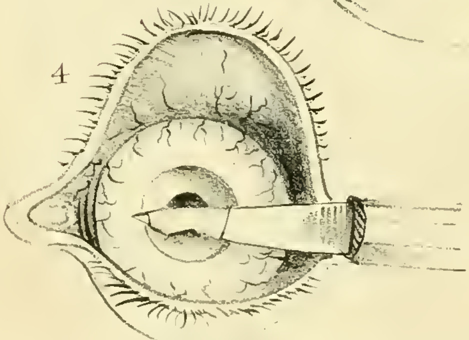

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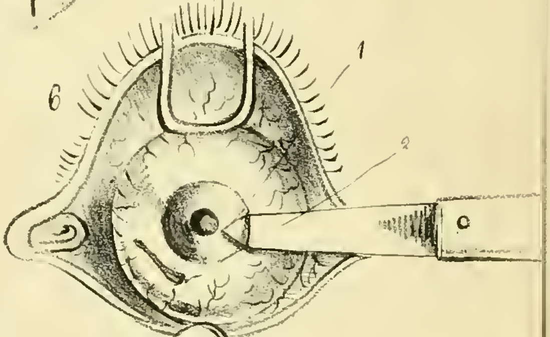

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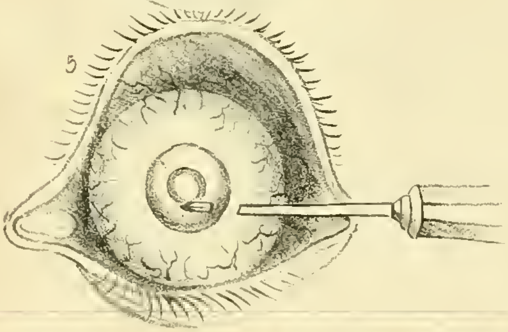

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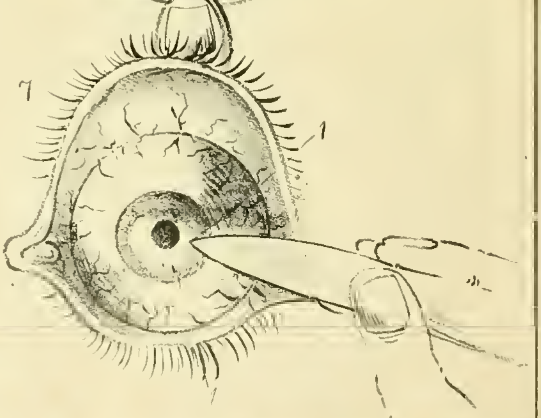

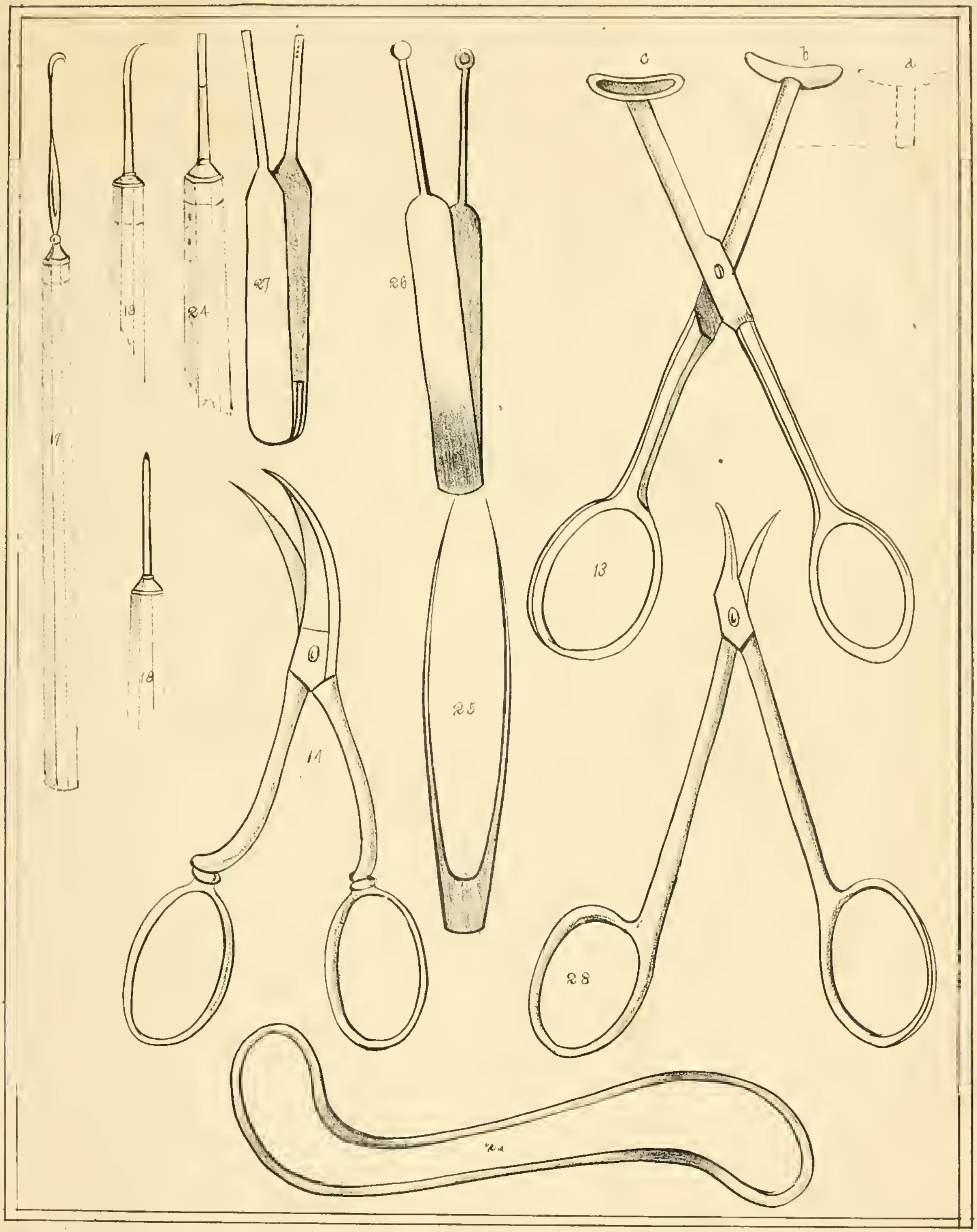
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